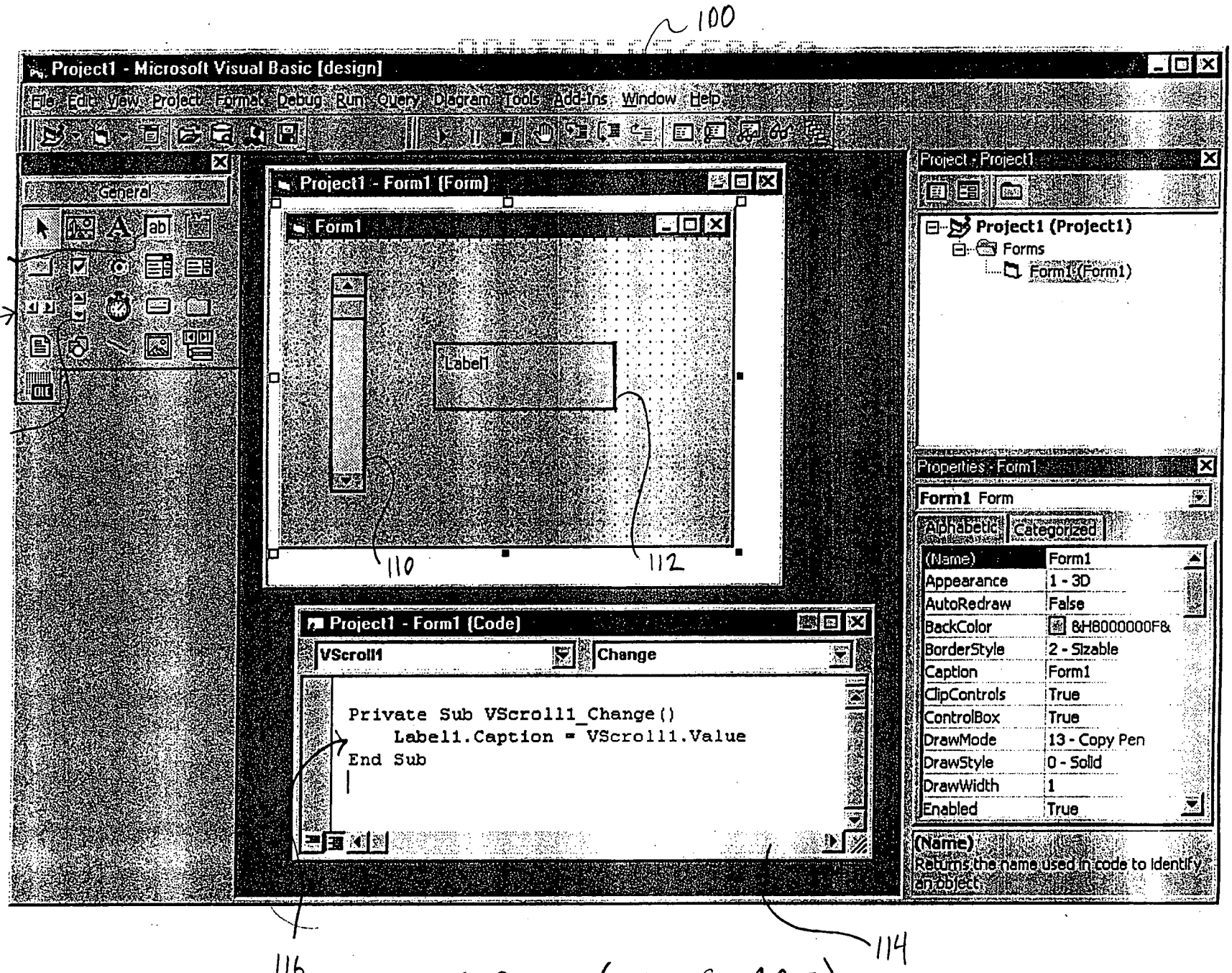


FIG. 1 (PRIOR ART)

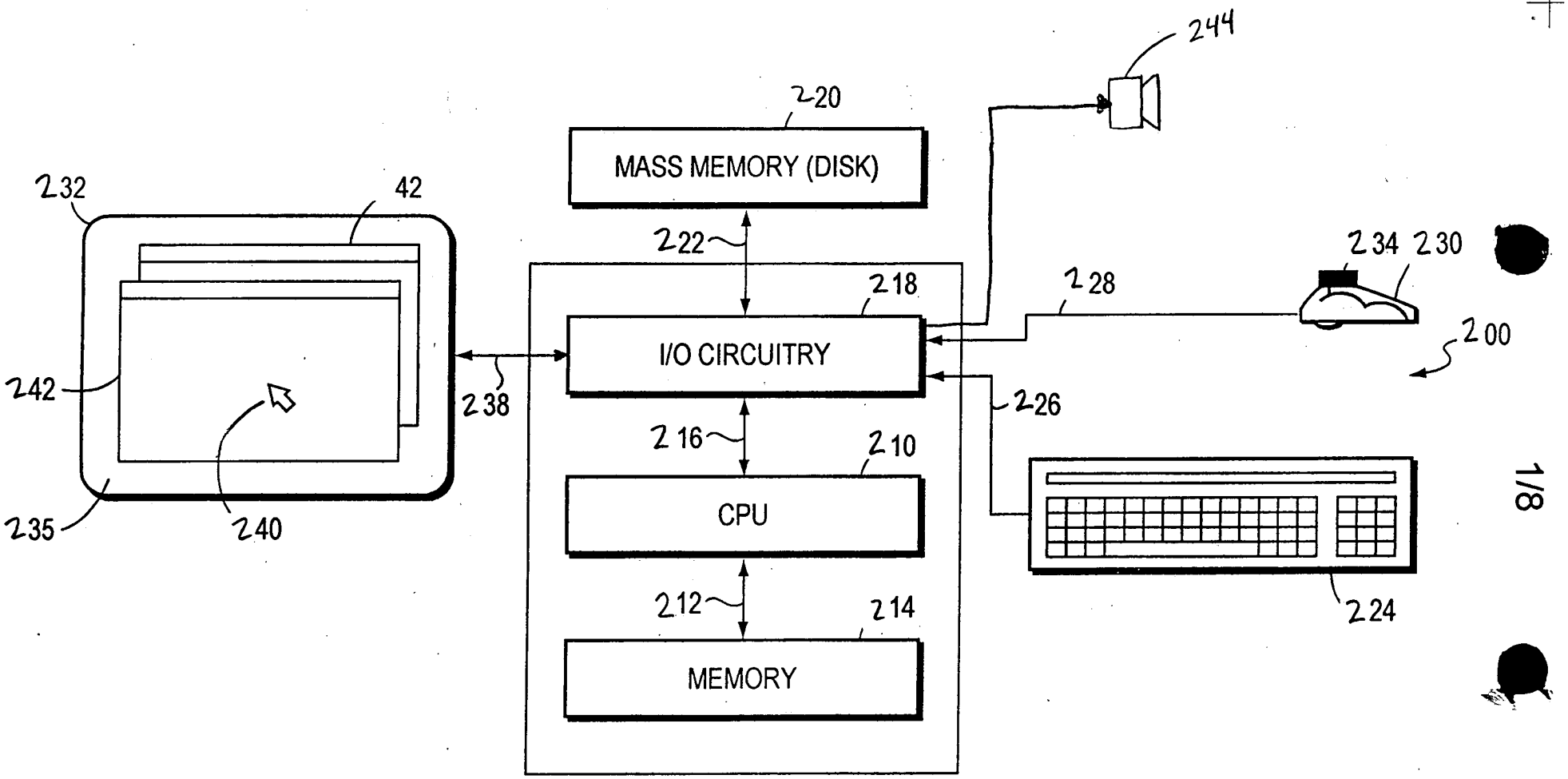
244
220
MASS MEMORY (DISK)
232
42
222
234
230
228
218
I/O CIRCUITRY
200
242
238
226
216
210
CPU
235
240
212
214
224
MEMORY

FIG. 2

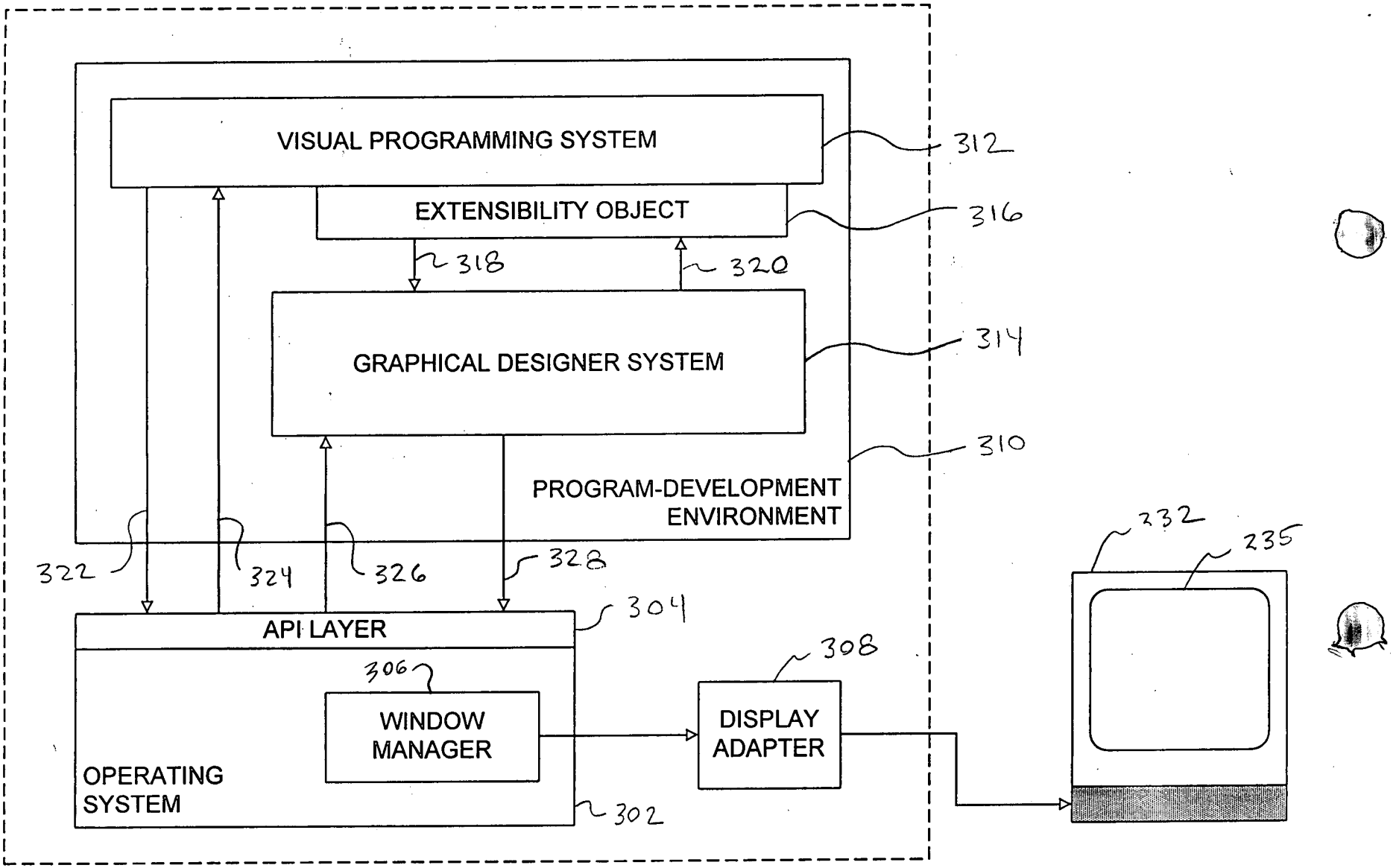
VISUAL PROGRAMMING SYSTEM
312
EXTENSIBILITY OBJECT
316
318
320
GRAPHICAL DESIGNER SYSTEM
314
310
PROGRAM-DEVELOPMENT ENVIRONMENT
322
324
326
328
API LAYER
304
306
WINDOW MANAGER
308
DISPLAY ADAPTER
OPERATING SYSTEM
302
232
235

FIG. 3

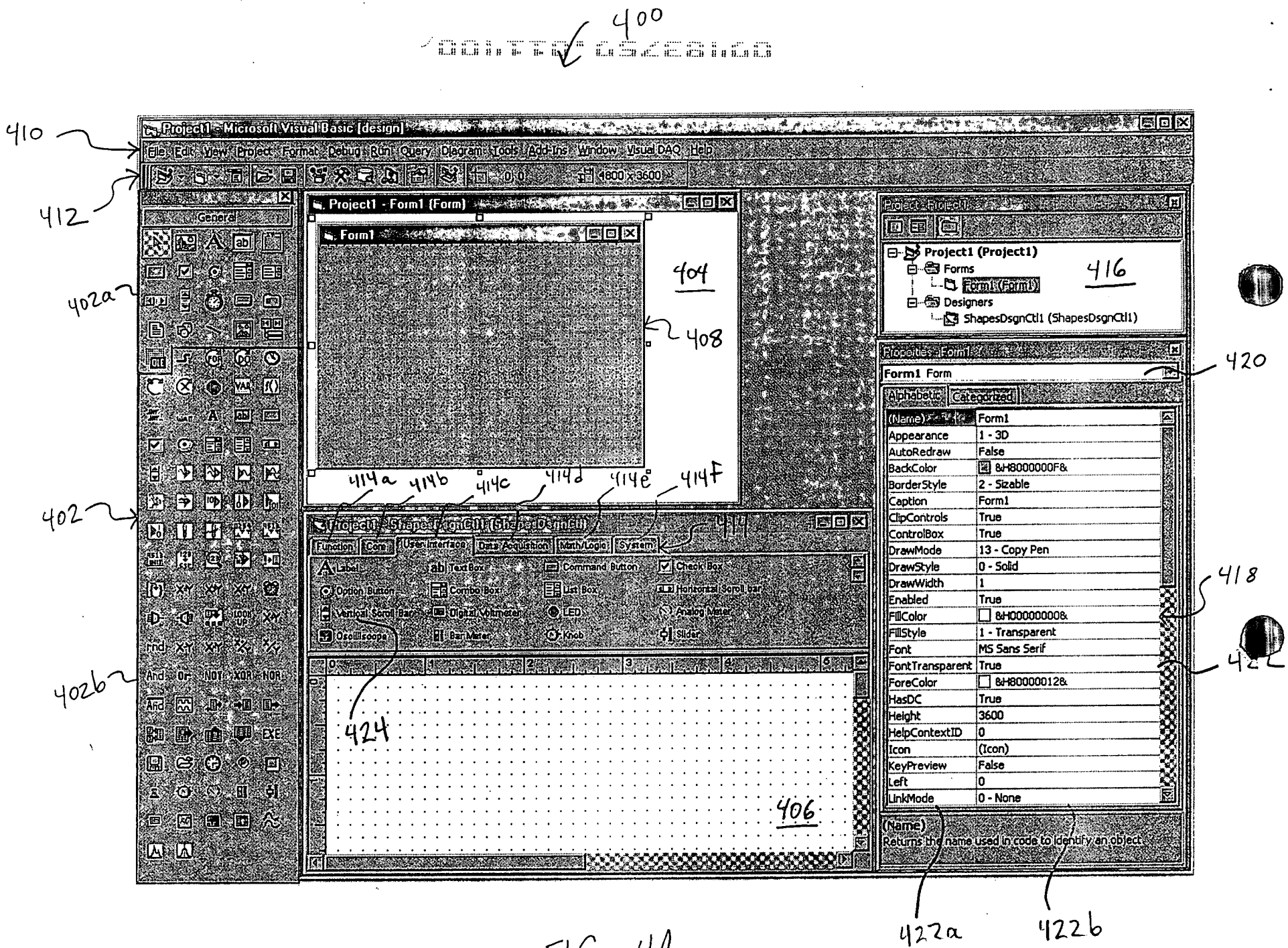
400
410
412
402a
402
402b
Project1 - Microsoft Visual Basic [design]
File Edit View Project Format Debug Run Query Diagram Tools Add-Ins Window Visual DAQ Help
General
Project1 - Form1 (Form)
Form1
404
408
414a
414b
414c
414d
414e
414f
414
Function
Com
User Interface
Data Acquisition
Math/Logic
System
Label
Text Box
Command Button
Check Box
Option Button
Combo Box
List Box
Horizontal Scroll Bar
Vertical Scroll Bar
Digital Voltmeter
LED
Analog Meter
Oscilloscope
Bar Meter
Knob
Slider
424
406
Project1 (Project1)
Forms
Form1 (Form1)
Designers
ShapesDsgnCtl1 (ShapesDsgnCtl1)
416
Properties - Form1
Form1 Form
420
Alphabetic
Categorized
(Name) Form1
Appearance 1 - 3D
AutoRedraw False
BackColor &H8000000F&
BorderStyle 2 - Sizable
Caption Form1
ClipControls True
ControlBox True
DrawMode 13 - Copy Pen
DrawStyle 0 - Solid
DrawWidth 1
Enabled True
FillColor &H00000000&
FillStyle 1 - Transparent
Font MS Sans Serif
FontTransparent True
ForeColor &H80000012&
HasDC True
Height 3600
HelpContextID 0
Icon (Icon)
KeyPreview False
Left 0
LinkMode 0 - None
418
422
(Name)
Returns the name used in code to identify an object.
422a
422b

FIG. 4A

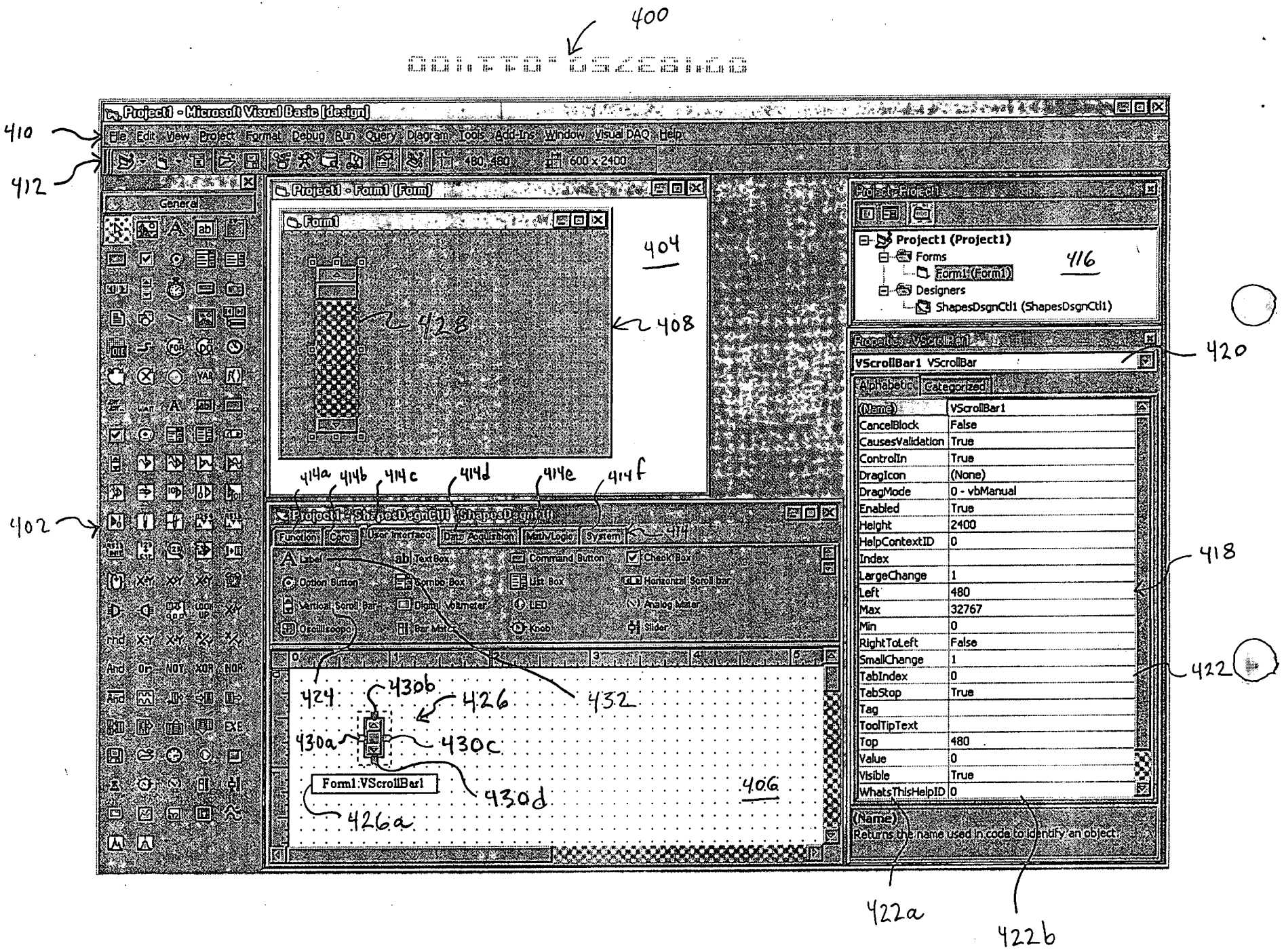
400
410
412
402
404
408
428
414a
414b
414c
414d
414e
414f
414
416
418
420
422
422a
422b
424
426
426a
430a
430b
430c
430d
432
406
Project1 - Microsoft Visual Basic [design]
File Edit View Project Format Debug Run Query Diagram Tools Add-Ins Window Visual DAQ Help
Project1 - Form1 (Form)
Form1
Project1 (Project1)
Forms
Form1 (Form1)
Designers
ShapesDsgnCtl1 (ShapesDsgnCtl1)
VScrollBar1 VScrollBar
Alphabetic
Categorized
(Name) VScrollBar1
CancelBlock False
CausesValidation True
ControlIn True
DragIcon (None)
DragMode 0 - vbManual
Enabled True
Height 2400
HelpContextID 0
Index
LargeChange 1
Left 480
Max 32767
Min 0
RightToLeft False
SmallChange 1
TabIndex 0
TabStop True
Tag
ToolTipText
Top 480
Value 0
Visible True
WhatsThisHelpID 0
(Name)
Returns the name used in code to identify an object.
Form1.VScrollBar1

FIG. 4B

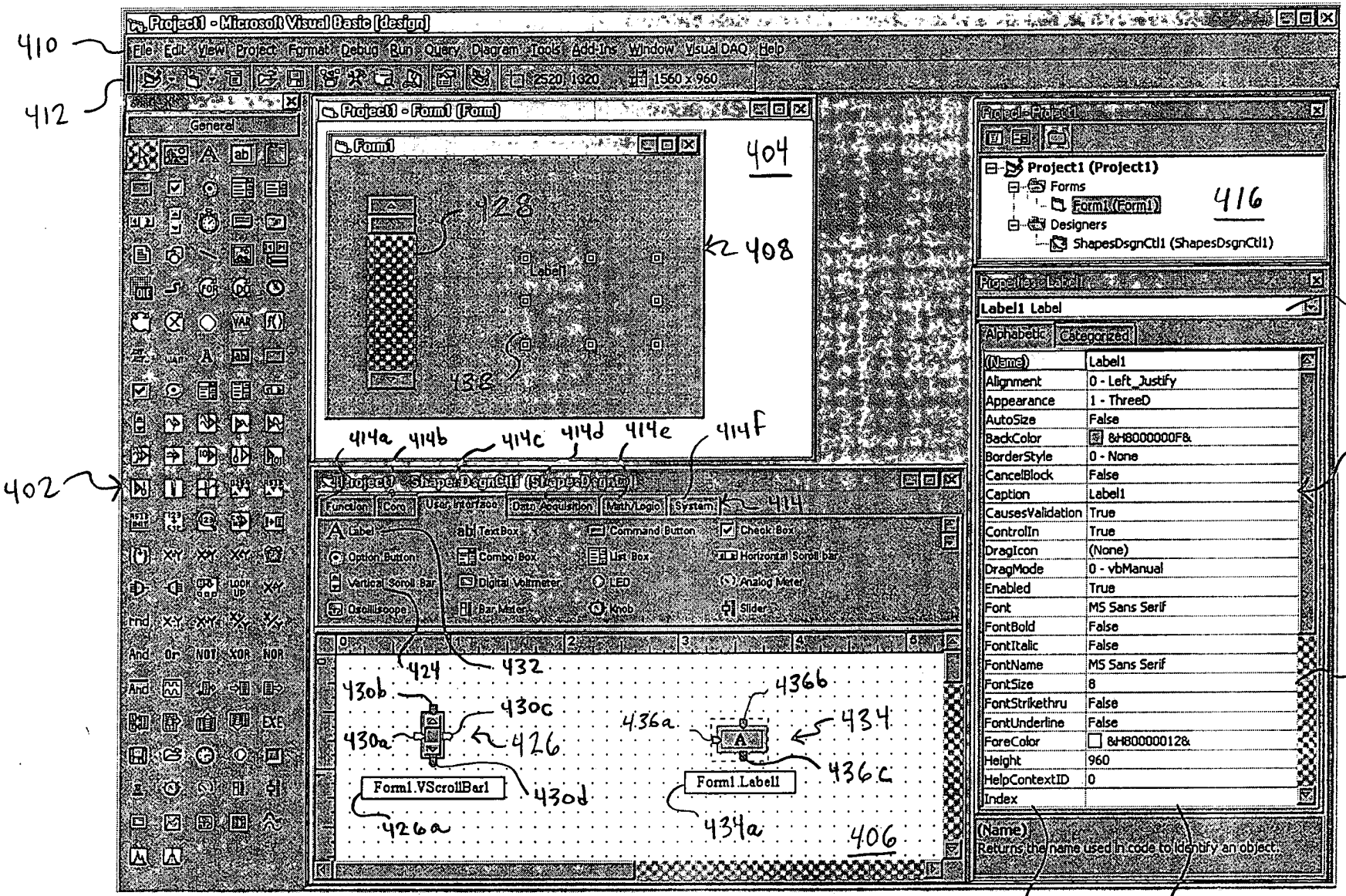
400
410
412
402
404
408
428
438
414a
414b
414c
414d
414e
414f
414
416
418
420
422
422a
422b
424
432
430a
430b
430c
430d
426
426a
434
434a
436a
436b
436c
406
Project1 - Microsoft Visual Basic [design]
File Edit View Project Format Debug Run Query Diagram Tools Add-Ins Window Visual DAQ Help
Form1
Label1
Project1 (Project1)
Forms
Form1 (Form1)
Designers
ShapesDsgnCtl1 (ShapesDsgnCtl1)
Label1 Label
Alphabetic
Categorized
(Name) Label1
Alignment 0 - Left Justify
Appearance 1 - ThreeD
AutoSize False
BackColor &H8000000F&
BorderStyle 0 - None
CancelBlock False
Caption Label1
CausesValidation True
ControlIn True
DragIcon (None)
DragMode 0 - vbManual
Enabled True
Font MS Sans Serif
FontBold False
FontItalic False
FontName MS Sans Serif
FontSize 8
FontStrikethru False
FontUnderline False
ForeColor &H80000012&
Height 960
HelpContextID 0
Index
(Name)
Returns the name used in code to identify an object.
Form1.VScrollBar1
Form1.Label1

FIG. 4C

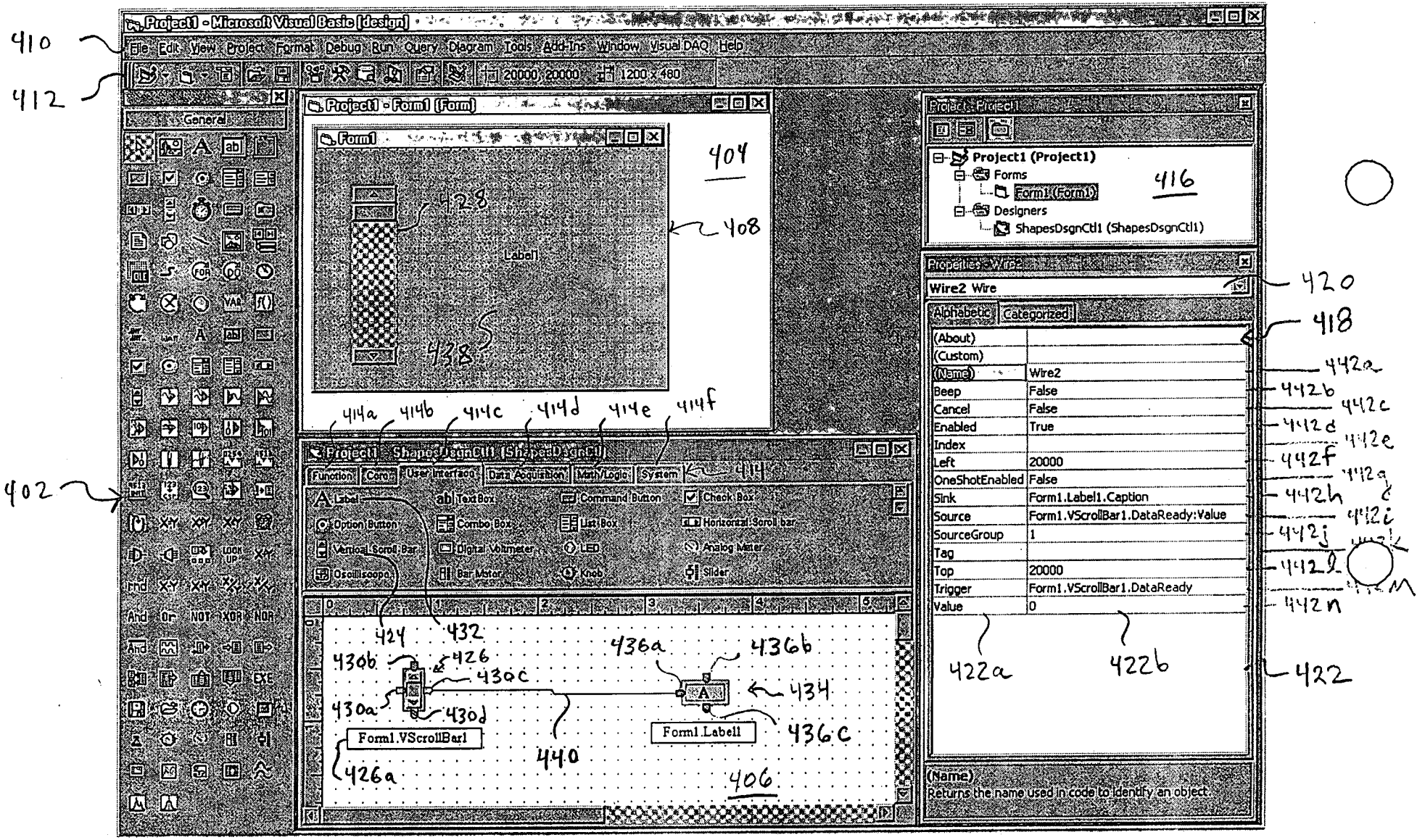
400
Project1 - Microsoft Visual Basic [design]
File Edit View Project Format Debug Run Query Diagram Tools Add-Ins Window Visual DAQ Help
410
412
General
Project1 - Form1 (Form)
Form1
404
408
Label1
428
438
414a 414b 414c 414d 414e 414f
Project1 - ShapesDsgnCtl1 (ShapesDsgnCtl1)
Function Core User Interface Data Acquisition Math/Logic System
414
Label Text Box Command Button Check Box
Option Button Combo Box List Box Horizontal Scroll Bar
Vertical Scroll Bar Digital Voltmeter LED Analog Meter
Oscilloscope Bar Meter Knob Slider
402
424 432
426
430a 430b 430c 430d
Form1.VScrollBar1
426a
440
436a 436b
434
Form1.Label1
436c
406
Project - Project1
Project1 (Project1)
Forms
Form1 (Form1)
416
Designers
ShapesDsgnCtl1 (ShapesDsgnCtl1)
Properties - Wire2
420
Wire2 Wire
Alphabetic Categorized
418
(About)
(Custom)
(Name) Wire2
Beep False
Cancel False
Enabled True
Index
Left 20000
OneShotEnabled False
Sink Form1.Label1.Caption
Source Form1.VScrollBar1.DataReady:Value
SourceGroup 1
Tag
Top 20000
Trigger Form1.VScrollBar1.DataReady
Value 0
442a 442b 442c 442d 442e 442f 442g 442h 442i 442j 442k 442l 442m 442n
422a 422b
422
(Name)
Returns the name used in code to identify an object.

FIG. 4D

UNITED STATES

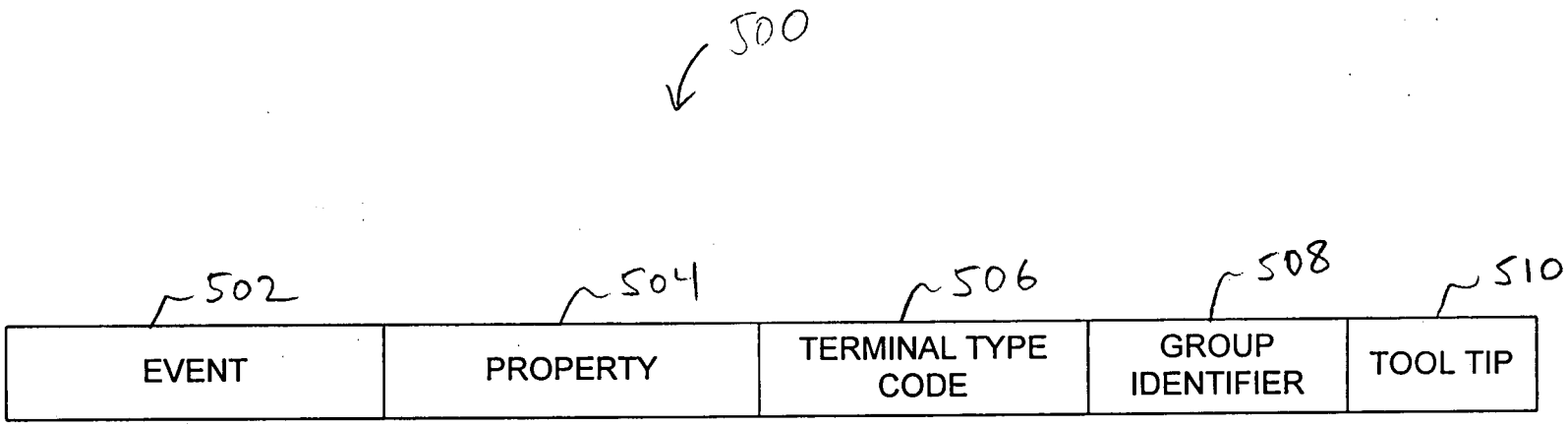


FIG. 5

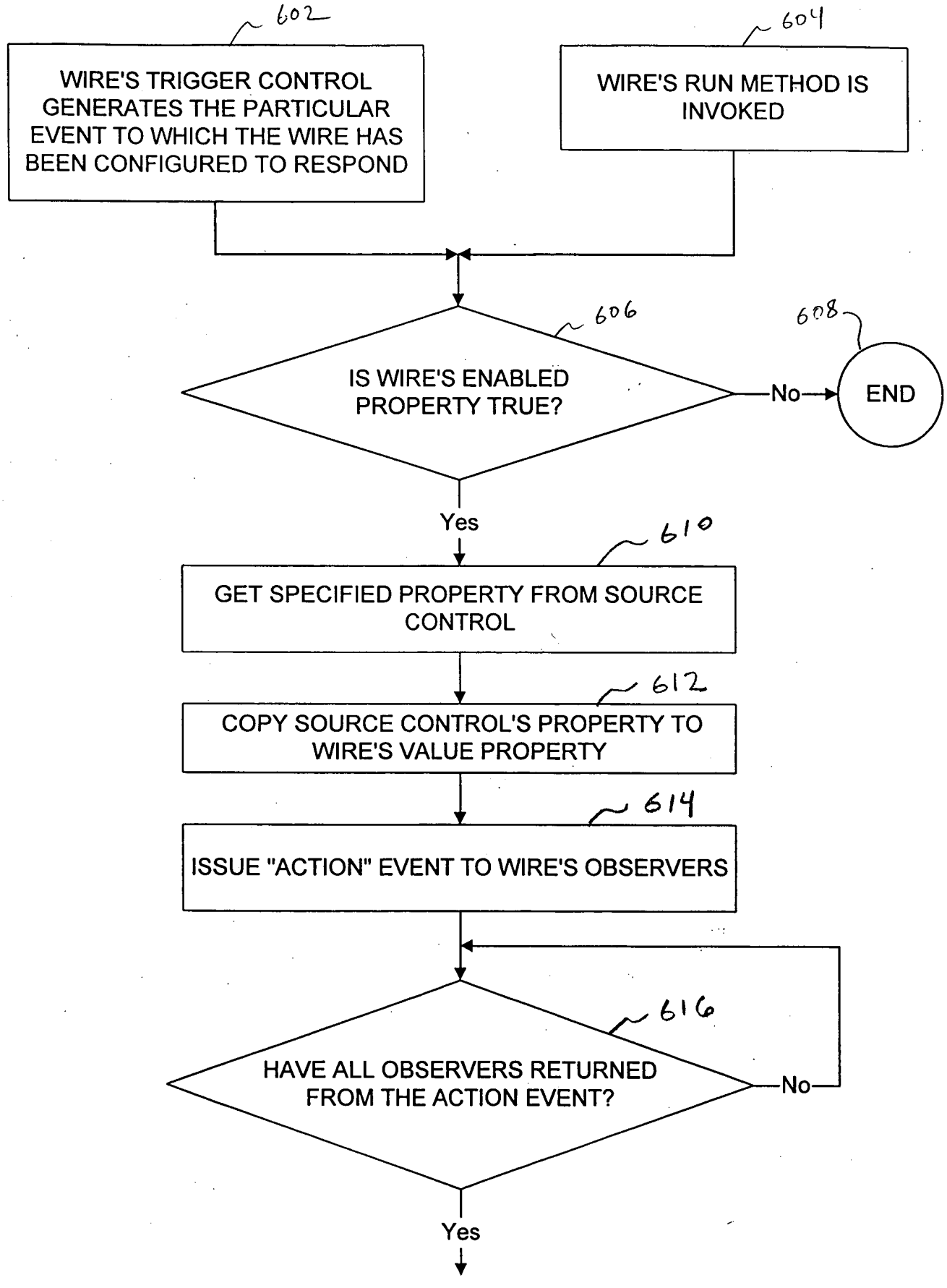
602
WIRE'S TRIGGER CONTROL GENERATES THE PARTICULAR EVENT TO WHICH THE WIRE HAS BEEN CONFIGURED TO RESPOND
604
WIRE'S RUN METHOD IS INVOKED
606
IS WIRE'S ENABLED PROPERTY TRUE?
No
608
END
Yes
610
GET SPECIFIED PROPERTY FROM SOURCE CONTROL
612
COPY SOURCE CONTROL'S PROPERTY TO WIRE'S VALUE PROPERTY
614
ISSUE "ACTION" EVENT TO WIRE'S OBSERVERS
616
HAVE ALL OBSERVERS RETURNED FROM THE ACTION EVENT?
No
Yes
TO FIG. 6B

FIG. 6A

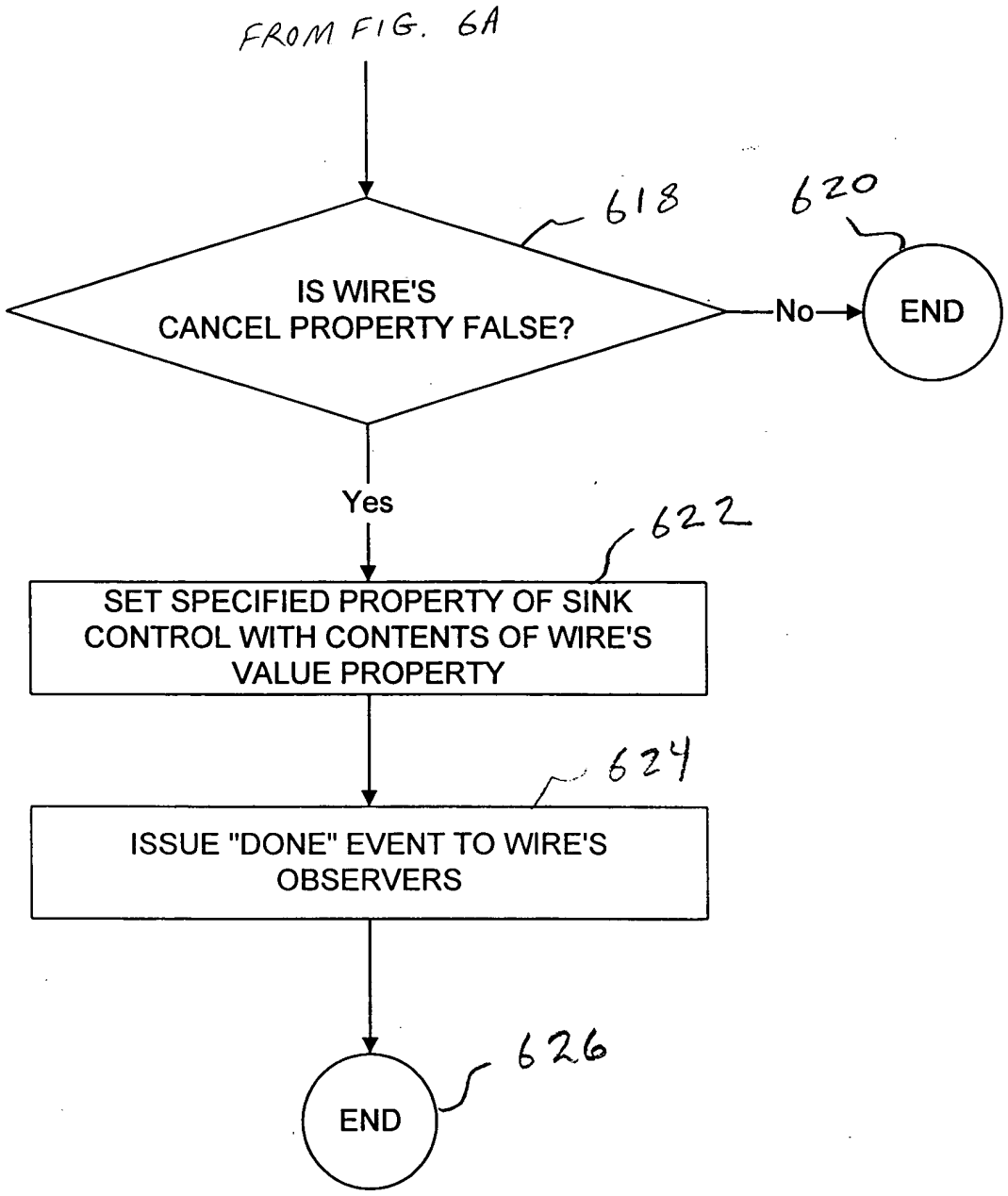
FROM FIG. 6A
618
620
IS WIRE'S CANCEL PROPERTY FALSE?
No
END
Yes
622
SET SPECIFIED PROPERTY OF SINK CONTROL WITH CONTENTS OF WIRE'S VALUE PROPERTY
624
ISSUE "DONE" EVENT TO WIRE'S OBSERVERS
626
END

FIG. 6B

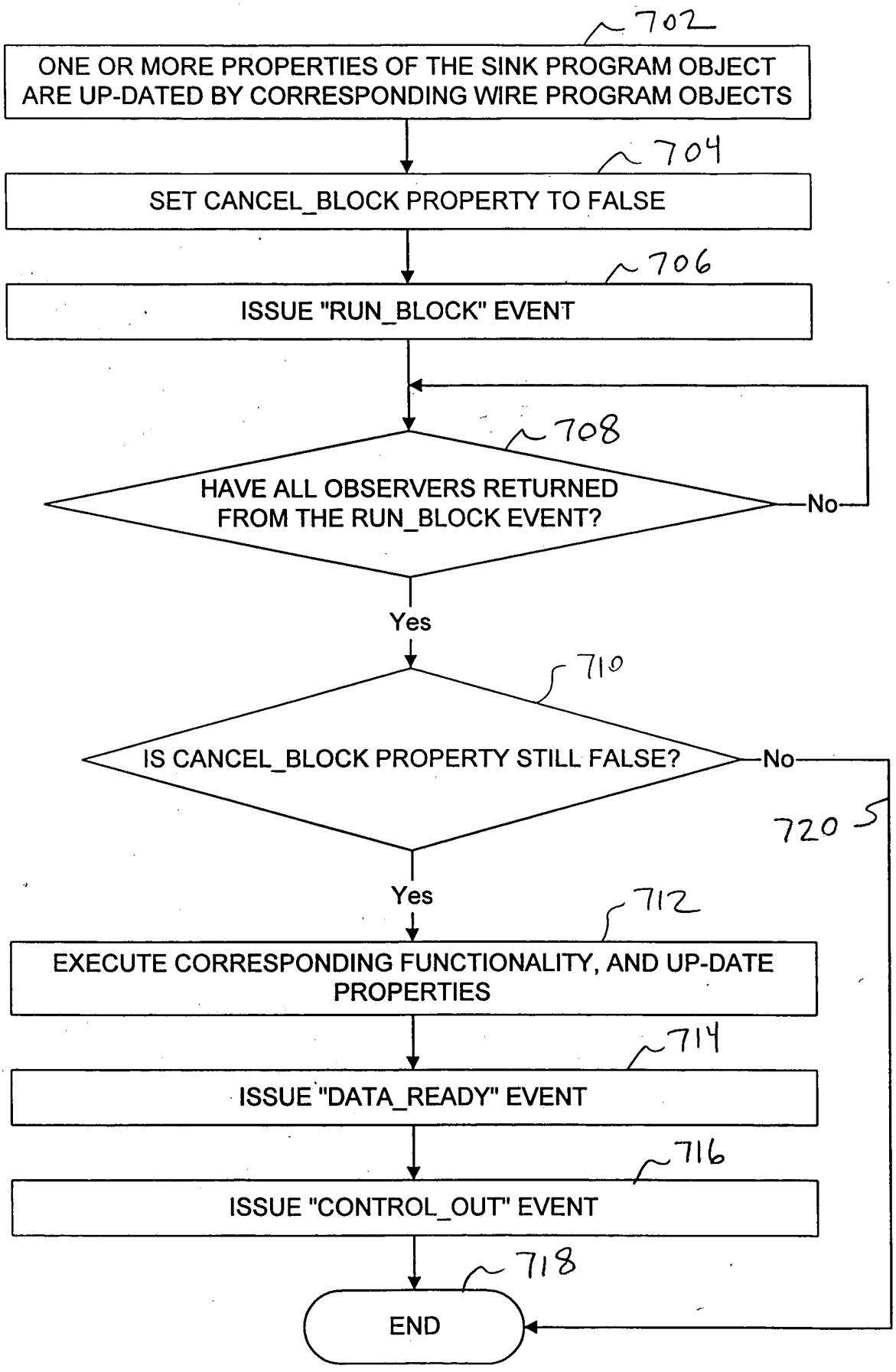
702
ONE OR MORE PROPERTIES OF THE SINK PROGRAM OBJECT ARE UP-DATED BY CORRESPONDING WIRE PROGRAM OBJECTS
704
SET CANCEL_BLOCK PROPERTY TO FALSE
706
ISSUE "RUN_BLOCK" EVENT
708
HAVE ALL OBSERVERS RETURNED FROM THE RUN_BLOCK EVENT?
No
Yes
710
IS CANCEL_BLOCK PROPERTY STILL FALSE?
No
720
Yes
712
EXECUTE CORRESPONDING FUNCTIONALITY, AND UP-DATE PROPERTIES
714
ISSUE "DATA_READY" EVENT
716
ISSUE "CONTROL_OUT" EVENT
718
END

FIG. 7

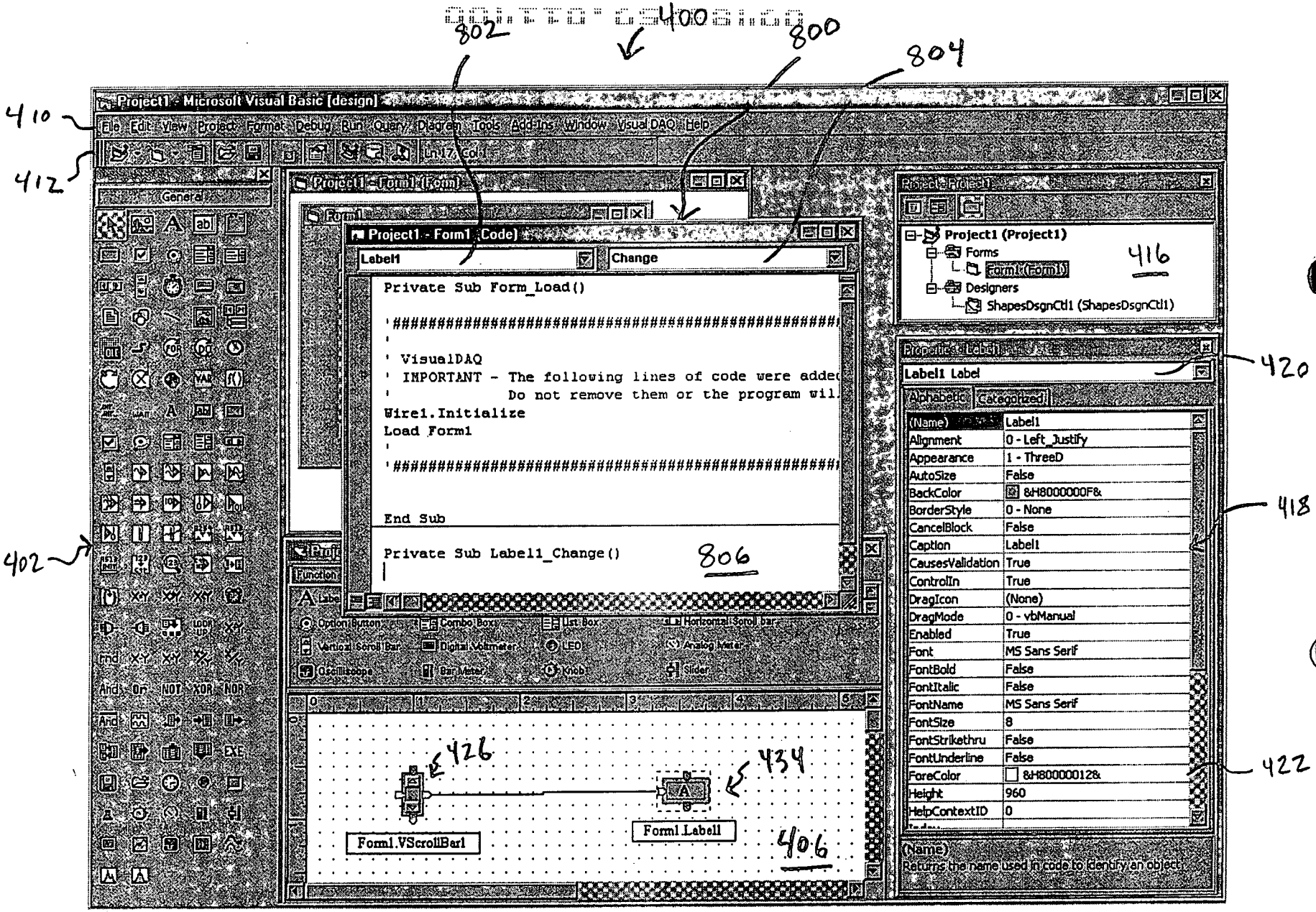
400
802
800
804
410
412
402
806
416
418
420
422
426
434
406
Project1 - Microsoft Visual Basic [design]
File Edit View Project Format Debug Run Query Diagram Tools Add-Ins Window Visual DAQ Help
Project1 - Form1 (Form)
Project1 - Form1 (Code)
Label1
Change
Private Sub Form_Load()
' VisualDAQ
' IMPORTANT - The following lines of code were added
' Do not remove them or the program will
Wire1.Initialize
Load Form1
End Sub
Private Sub Label1_Change()
Project1 (Project1)
Forms
Form1 (Form1)
Designers
ShapesDsgnCtl1 (ShapesDsgnCtl1)
Properties - Label1
Label1 Label
Alphabetic
Categorized
(Name) Label1
Alignment 0 - Left Justify
Appearance 1 - ThreeD
AutoSize False
BackColor &H8000000F&
BorderStyle 0 - None
CancelBlock False
Caption Label1
CausesValidation True
ControlIn True
DragIcon (None)
DragMode 0 - vbManual
Enabled True
Font MS Sans Serif
FontBold False
FontItalic False
FontName MS Sans Serif
FontSize 8
FontStrikethru False
FontUnderline False
ForeColor &H80000012&
Height 960
HelpContextID 0
(Name)
Returns the name used in code to identify an object.
Form1.VScroll1
Form1.Label1

FIG. 8A

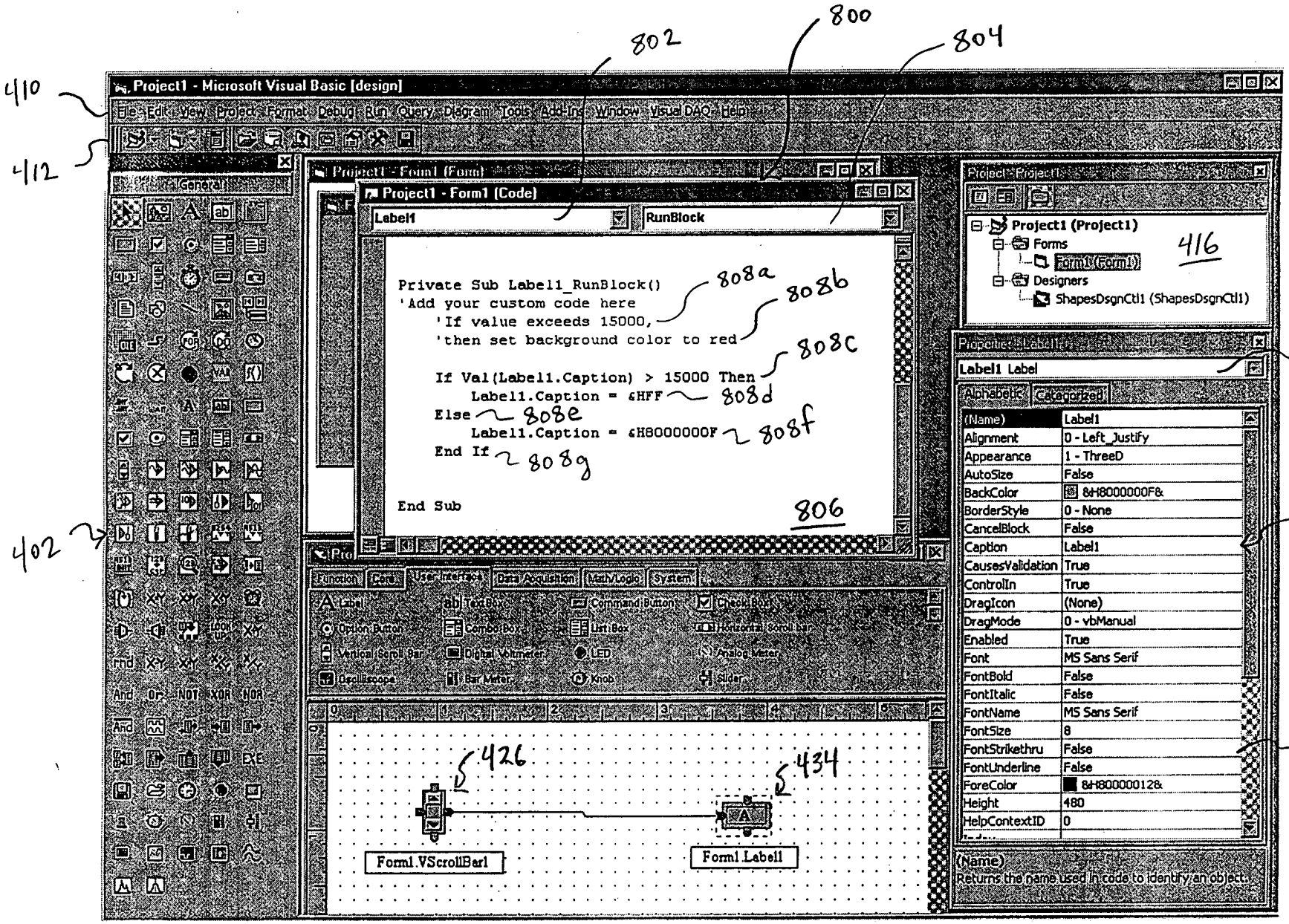
800
802
804
410
412
Project1 - Microsoft Visual Basic [design]
File Edit View Project Format Debug Run Query Diagram Tools Add-Ins Window Visual SAG Help
General
Project1 - Form1 (Form)
Project1 - Form1 (Code)
Label1
RunBlock
Private Sub Label1_RunBlock()
'Add your custom code here
'If value exceeds 15000,
'then set background color to red
If Val(Label1.Caption) > 15000 Then
Label1.Caption = &HFF
Else
Label1.Caption = &H8000000F
End If
End Sub
808a
808b
808c
808d
808e
808f
808g
806
402
Function Core User Interface Data Acquisition Math/Logic System
Label
TextBox
Command Button
Check Box
Option Button
ComboBox
List Box
Horizontal Scroll Bar
Vertical Scroll Bar
Digital Voltmeter
LED
Analog Meter
Oscilloscope
Bar Meter
Knob
Slider
426
434
Form1.VScrollBar1
Form1.Label1
Project - Project1
Project1 (Project1)
Forms
Form1 (Form1)
Designers
ShapesDsgnCtl1 (ShapesDsgnCtl1)
416
Properties - Label1
Label1 Label
420
Alphabetic
Categorized
(Name) Label1
Alignment 0 - Left Justify
Appearance 1 - ThreeD
AutoSize False
BackColor &H8000000F&
BorderStyle 0 - None
CancelBlock False
Caption Label1
CausesValidation True
ControlIn True
DragIcon (None)
DragMode 0 - vbManual
Enabled True
Font MS Sans Serif
FontBold False
FontItalic False
FontName MS Sans Serif
FontSize 8
FontStrikethru False
FontUnderline False
ForeColor &H80000012&
Height 480
HelpContextID 0
418
422
(Name)
Returns the name used in code to identify an object.

FIG. 8B

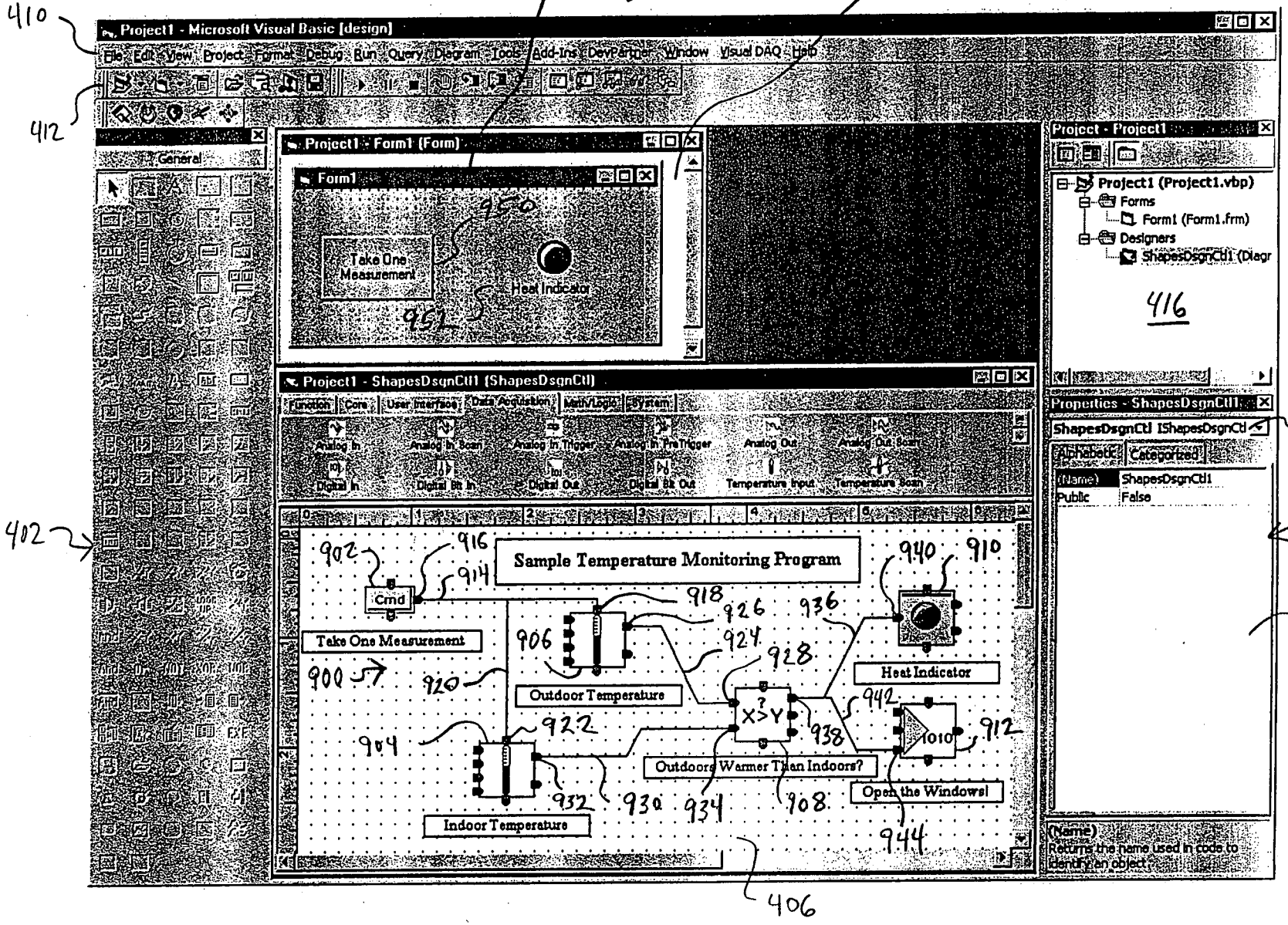
Project1 - Microsoft Visual Basic [design]
Project1 - Form1 (Form)
Form1
Take One Measurement
Heat Indicator
Project1 - ShapesDsgnCtl1 (ShapesDsgnCtl)
Sample Temperature Monitoring Program
Cmd
Take One Measurement
Outdoor Temperature
Indoor Temperature
Heat Indicator
Outdoors Warmer Than Indoors?
Open the Windows!
Project - Project1
Project1 (Project1.vbp)
Forms
Form1 (Form1.frm)
Designers
ShapesDsgnCtl1 (Diagr
Properties - ShapesDsgnCtl1
ShapesDsgnCtl1 IShapesDsgnCtl
Alphabetic
Categorized
(Name)
ShapesDsgnCtl1
Public
False
(Name)
Returns the name used in code to identify an object.
400
402
404
406
408
410
412
416
418
420
422
900
902
904
906
908
910
912
914
916
918
920
922
924
926
928
930
932
934
936
938
940
942
944
950
952

FIG. 9

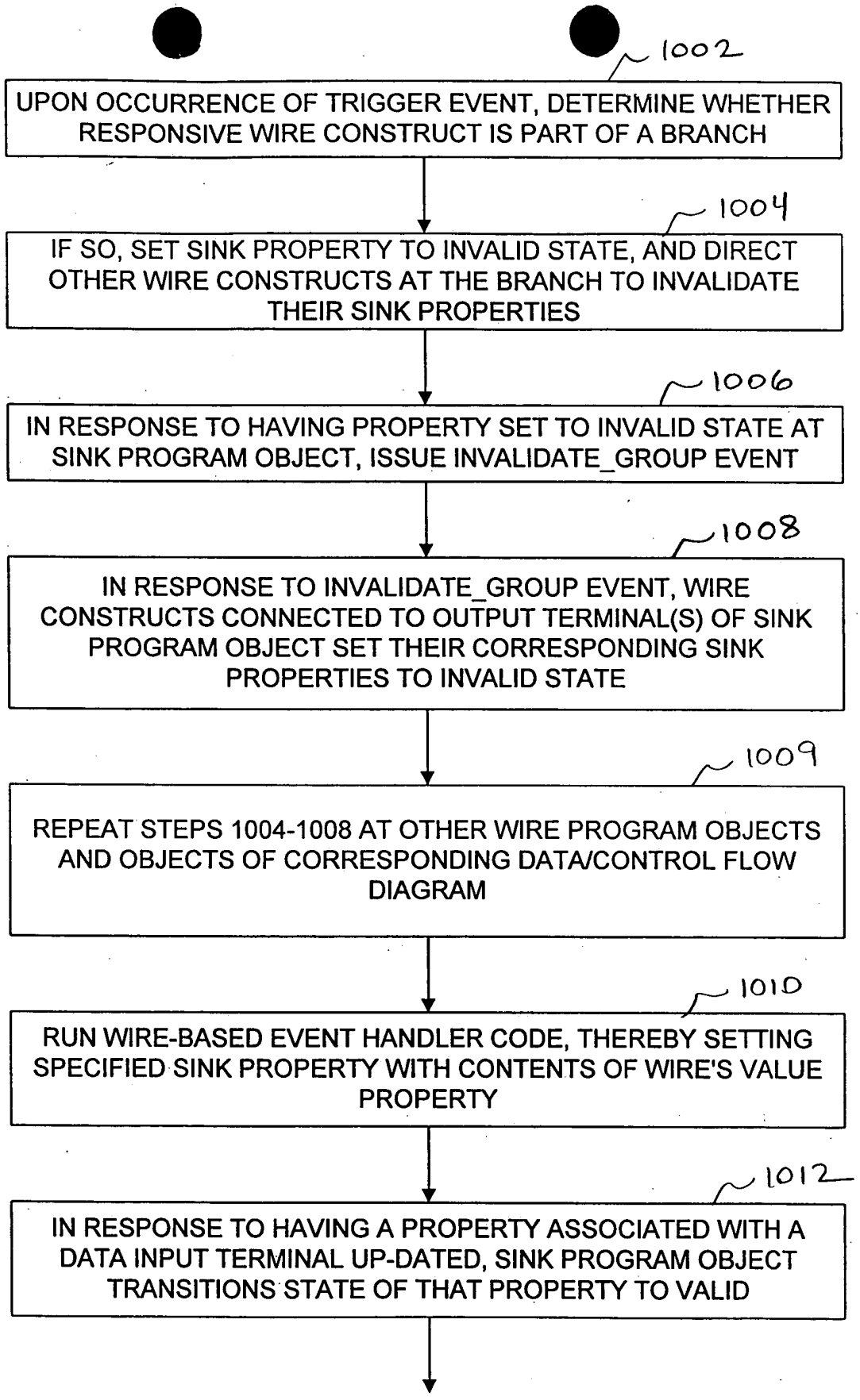
1002
UPON OCCURRENCE OF TRIGGER EVENT, DETERMINE WHETHER RESPONSIVE WIRE CONSTRUCT IS PART OF A BRANCH
1004
IF SO, SET SINK PROPERTY TO INVALID STATE, AND DIRECT OTHER WIRE CONSTRUCTS AT THE BRANCH TO INVALIDATE THEIR SINK PROPERTIES
1006
IN RESPONSE TO HAVING PROPERTY SET TO INVALID STATE AT SINK PROGRAM OBJECT, ISSUE INVALIDATE_GROUP EVENT
1008
IN RESPONSE TO INVALIDATE_GROUP EVENT, WIRE CONSTRUCTS CONNECTED TO OUTPUT TERMINAL(S) OF SINK PROGRAM OBJECT SET THEIR CORRESPONDING SINK PROPERTIES TO INVALID STATE
1009
REPEAT STEPS 1004-1008 AT OTHER WIRE PROGRAM OBJECTS AND OBJECTS OF CORRESPONDING DATA/CONTROL FLOW DIAGRAM
1010
RUN WIRE-BASED EVENT HANDLER CODE, THEREBY SETTING SPECIFIED SINK PROPERTY WITH CONTENTS OF WIRE'S VALUE PROPERTY
1012
IN RESPONSE TO HAVING A PROPERTY ASSOCIATED WITH A DATA INPUT TERMINAL UP-DATED, SINK PROGRAM OBJECT TRANSITIONS STATE OF THAT PROPERTY TO VALID
TO FIG. 10B

FIG. 10A

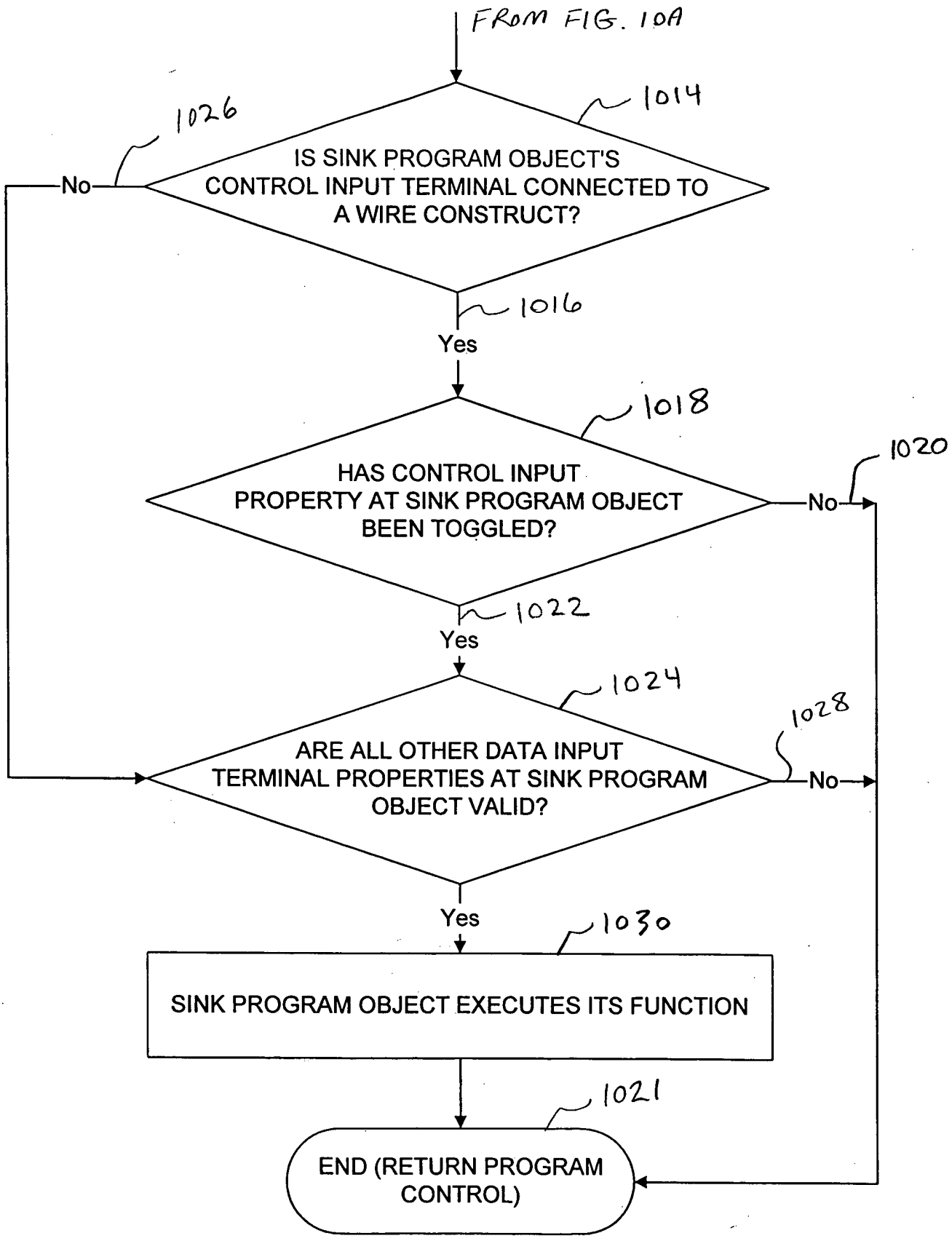
FROM FIG. 10A
1014
IS SINK PROGRAM OBJECT'S CONTROL INPUT TERMINAL CONNECTED TO A WIRE CONSTRUCT?
1026
No
1016
Yes
1018
HAS CONTROL INPUT PROPERTY AT SINK PROGRAM OBJECT BEEN TOGGLED?
1020
No
1022
Yes
1024
ARE ALL OTHER DATA INPUT TERMINAL PROPERTIES AT SINK PROGRAM OBJECT VALID?
1028
No
Yes
1030
SINK PROGRAM OBJECT EXECUTES ITS FUNCTION
1021
END (RETURN PROGRAM CONTROL)

FIG. 10B

DRAFT 1100

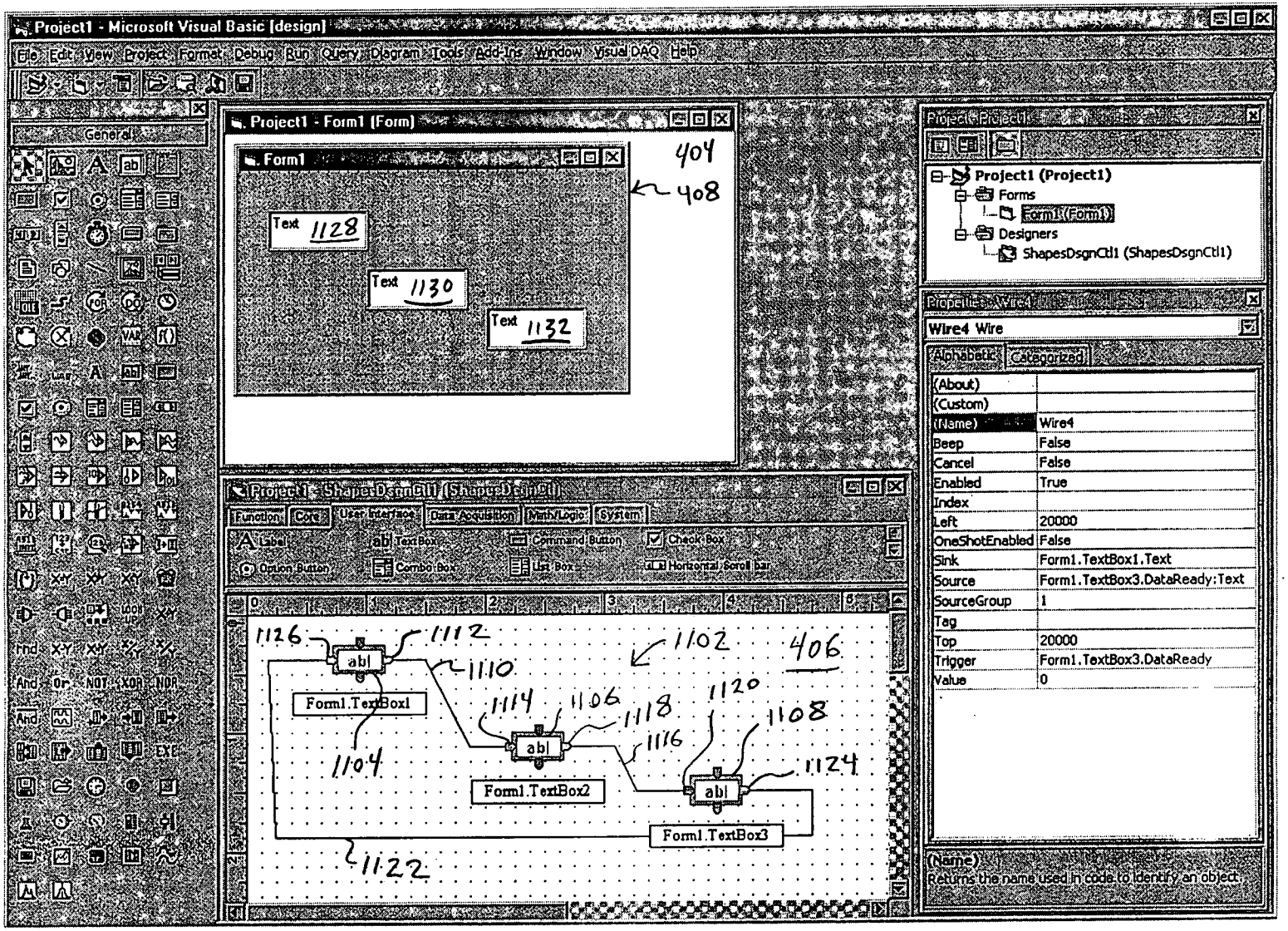


FIG. 11

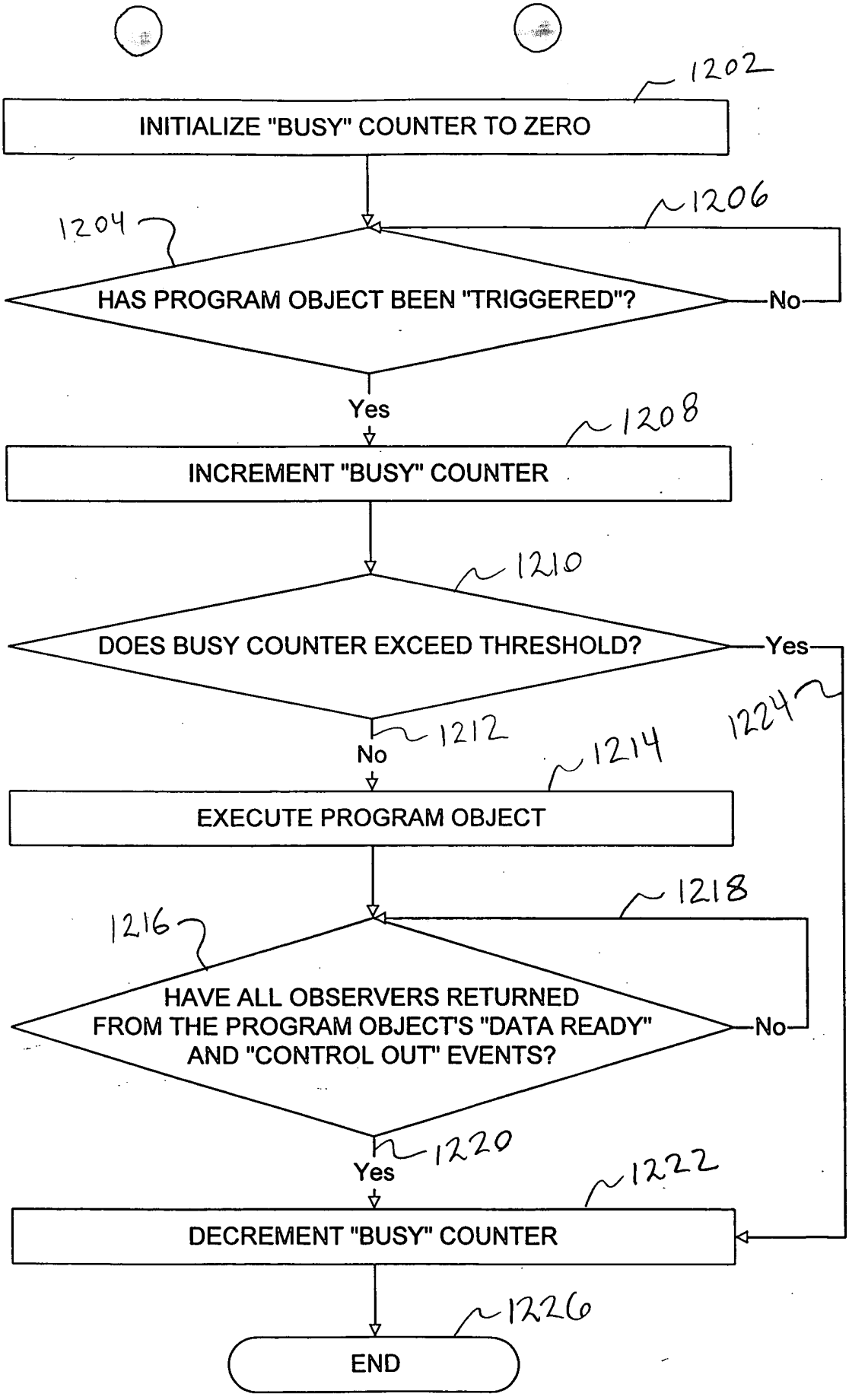
1202
INITIALIZE "BUSY" COUNTER TO ZERO
1204
1206
HAS PROGRAM OBJECT BEEN "TRIGGERED"?
No
Yes
1208
INCREMENT "BUSY" COUNTER
1210
DOES BUSY COUNTER EXCEED THRESHOLD?
Yes
No
1212
1224
1214
EXECUTE PROGRAM OBJECT
1218
1216
HAVE ALL OBSERVERS RETURNED
FROM THE PROGRAM OBJECT'S "DATA READY"
AND "CONTROL OUT" EVENTS?
No
Yes
1220
1222
DECREMENT "BUSY" COUNTER
1226
END

FIG. 12

DO NOT DESIGN

1300

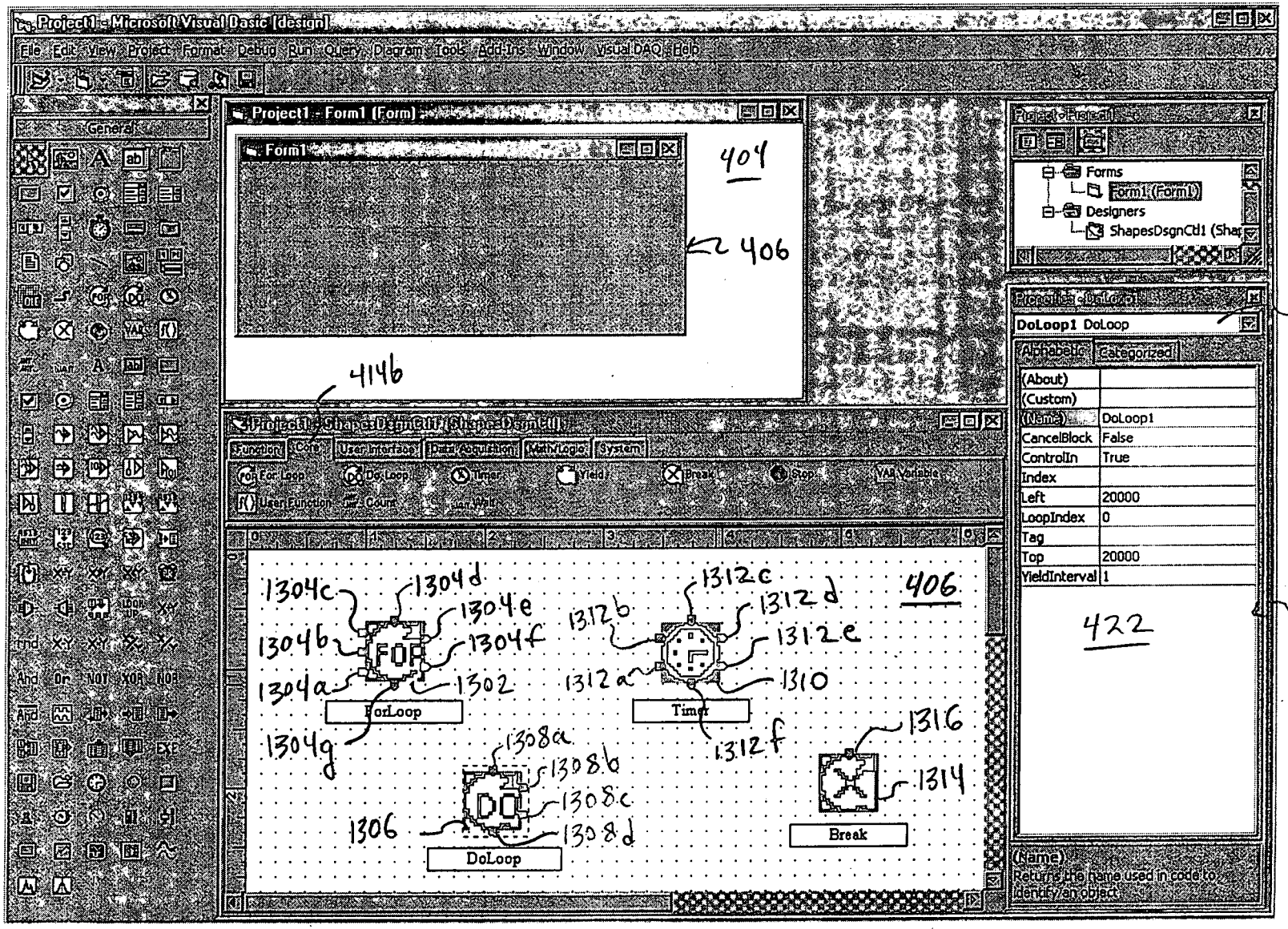


FIG. 13

1400

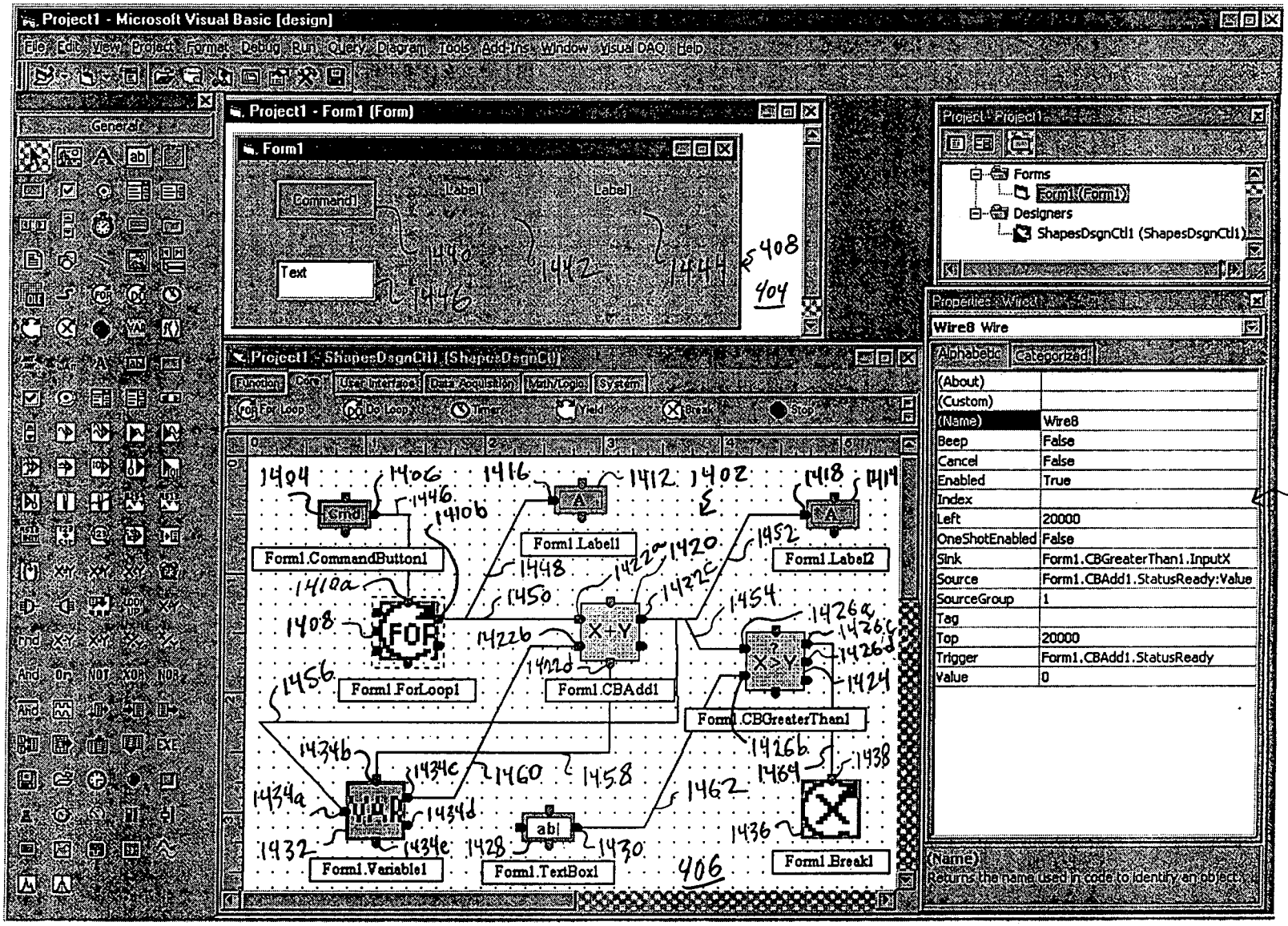
Project1 - Microsoft Visual Basic [design]
File Edit View Project Format Debug Run Query Diagram Tools Add-Ins Window Visual DAQ Help
General
Project1 - Form1 (Form)
Form1
Command1
Label1
Label1
Text
1440
1442
1444
1446
408
404
Project - Project1
Forms
Form1 (Form1)
Designers
ShapesDsgnCtl1 (ShapesDsgnCtl1)
Properties - Wire8
Wire8 Wire
Alphabetic
Categorized
(About)
(Custom)
(Name) Wire8
Beep False
Cancel False
Enabled True
Index
Left 20000
OneShotEnabled False
Sink Form1.CBGreaterThan1.InputX
Source Form1.CBAdd1.StatusReady:Value
SourceGroup 1
Tag
Top 20000
Trigger Form1.CBAdd1.StatusReady
Value 0
(Name)
Returns the name used in code to identify an object.
418
Project1 - ShapesDsgnCtl1 (ShapesDsgnCtl)
Function
Core
User Interface
Data Acquisition
Math/Logic
System
For Loop
Do Loop
Timer
Yield
Break
Stop
1404
1406
1446
1410b
1410a
1408
1456
1434b
1434a
1432
1434c
1434d
1434e
1460
1458
1428
1430
1462
1464
1436
1438
1416
1412
1402
1418
1419
1448
1450
1422a
1422b
1422c
1454
1426a
1426c
1426d
1424
1426b
1452
Form1.CommandButton1
Form1.ForLoop1
Form1.CBAdd1
Form1.Label1
Form1.Label2
Form1.CBGreaterThan1
Form1.Variable1
Form1.TextBox1
Form1.Break1
406

FIG. 14A

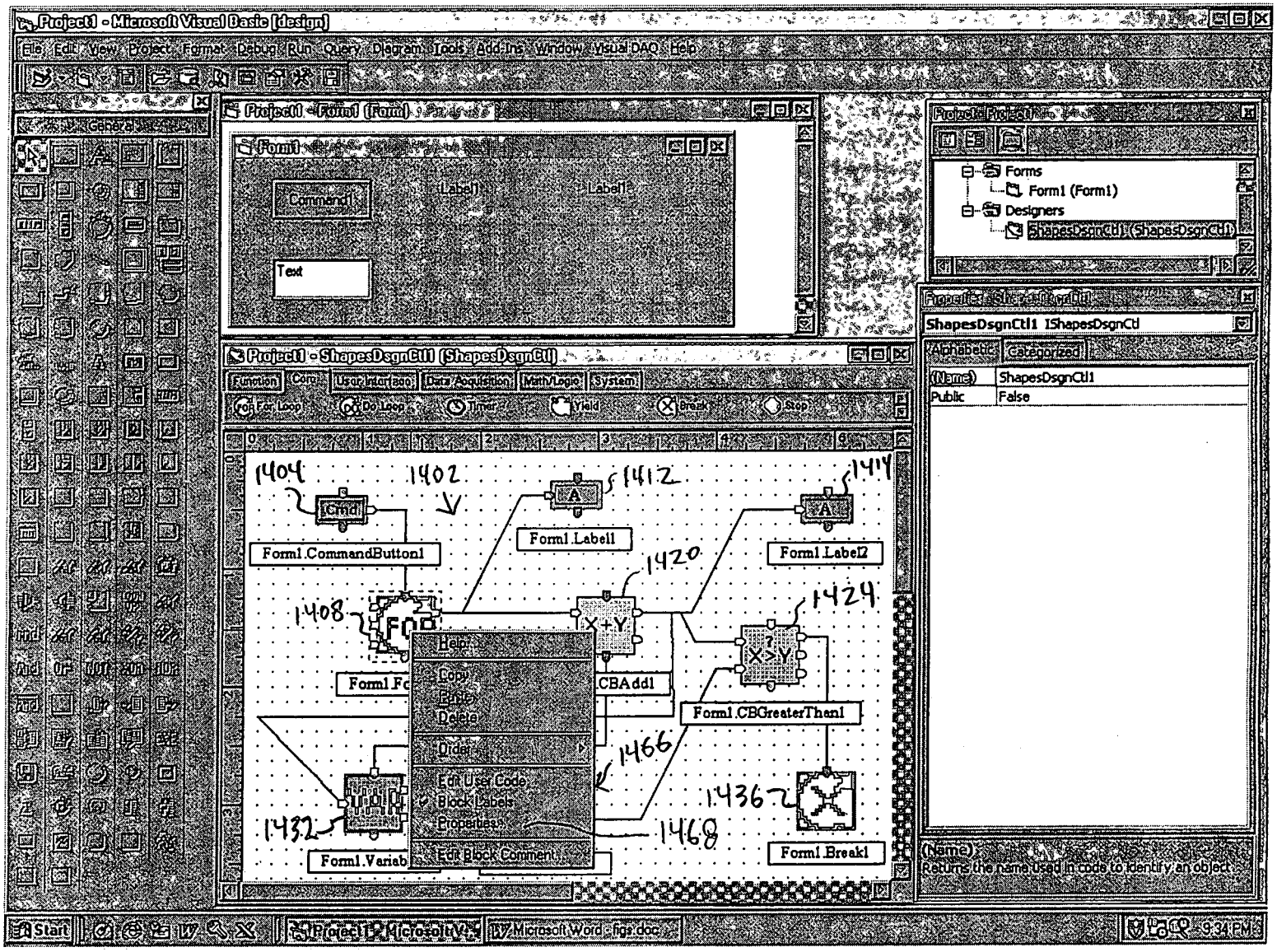
1400
Project1 - Microsoft Visual Basic [design]
Form1
Command1
Label1
Label2
Text
Project1 - ShapesDsgnCtl1 (ShapesDsgnCtl)
Function
Com
User Interface
Data Acquisition
Math/Logic
System
For Loop
Do Loop
Timer
Yield
Break
Stop
1404
1402
1412
1414
Cmd
A
A
Form1.CommandButton1
Form1.Label1
Form1.Label2
1420
1408
1424
X+Y
X>Y
Help
Copy
Paste
Delete
Order
Edit User Code
Block Labels
Properties
Edit Block Comment
CBAdd1
Form1.CBGreaterThan1
1466
1436
1432
1468
Form1.Variab
Form1.Break1
Forms
Form1 (Form1)
Designers
ShapesDsgnCtl1 (ShapesDsgnCtl)
ShapesDsgnCtl1 IShapesDsgnCtl
Alphabetic
Categorized
(Name)
ShapesDsgnCtl1
Public
False
(Name)
Returns the name used in code to identify an object
Start
9:34 PM

FIG. 14B

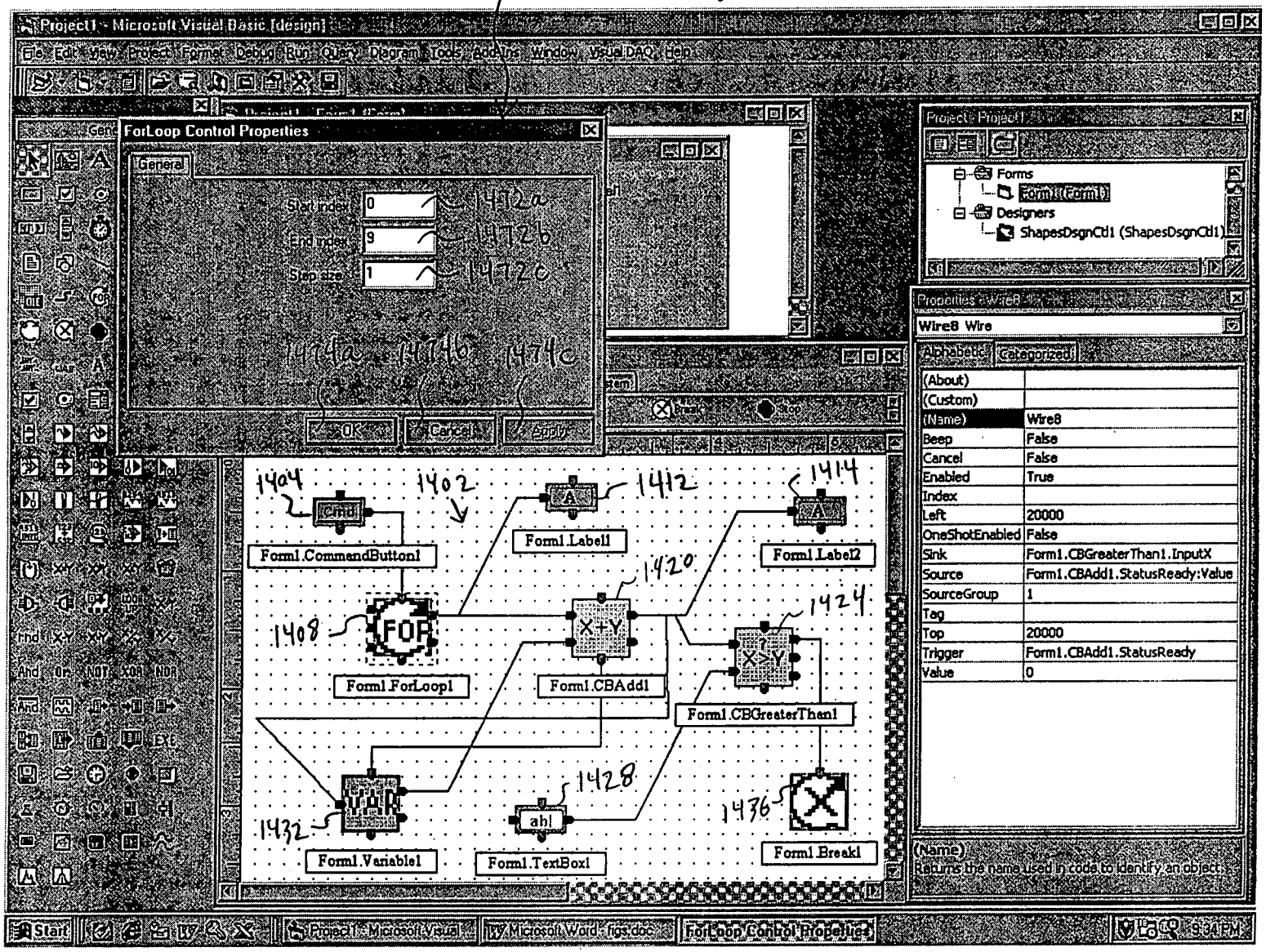
1470
1400
Project1 - Microsoft Visual Basic [design]
ForLoop Control Properties
General
Start index
End index
Step size
OK
Cancel
Apply
1472a
1472b
1472c
1474a
1474b
1474c
Project - Project1
Forms
Form1 (Form1)
Designers
ShapesDsgnCtl1 (ShapesDsgnCtl1)
Properties - Wire8
Wire8 Wire
Alphabetic
Categorized
(About)
(Custom)
(Name) Wire8
Beep False
Cancel False
Enabled True
Index
Left 20000
OneShotEnabled False
Sink Form1.CBGreaterThan1.InputX
Source Form1.CBAdd1.StatusReady:Value
SourceGroup 1
Tag
Top 20000
Trigger Form1.CBAdd1.StatusReady
Value 0
(Name)
Returns the name used in code to identify an object.
1404
1402
1412
1414
Form1.CommandButton1
Form1.Label1
Form1.Label2
1420
1408
1424
Form1.ForLoop1
Form1.CBAdd1
Form1.CBGreaterThan1
1428
1432
1436
Form1.Variable1
Form1.TextBox1
Form1.Break1
Start
Project1 - Microsoft Visual
Microsoft Word - figs.doc
ForLoop Control Properties
9:34 PM

FIG. 14C

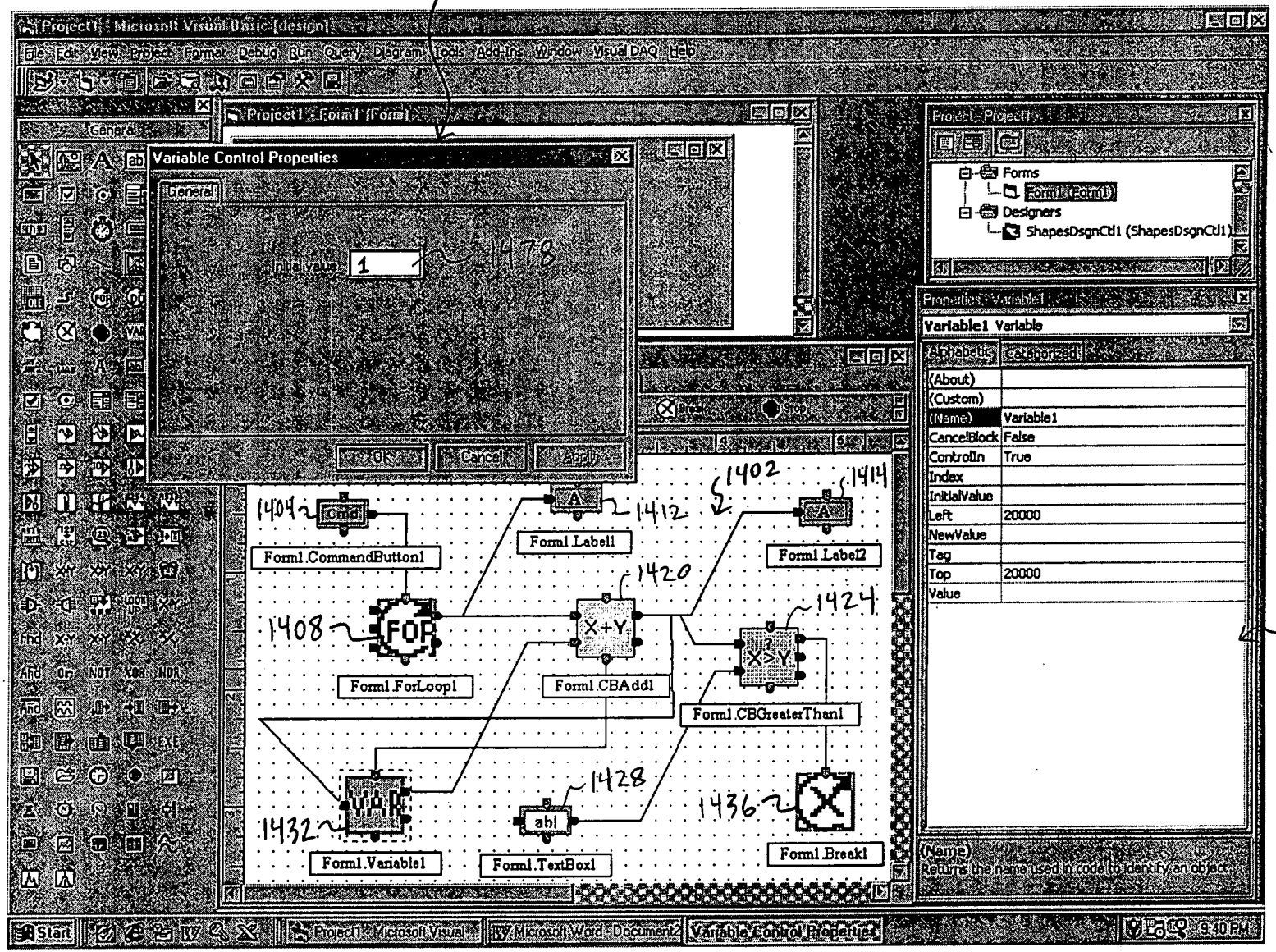
1476
1400
Project1 - Microsoft Visual Basic [design]
Variable Control Properties
General
Initial value
1
1478
OK
Cancel
Apply
Project1 - Form1 (Form)
Project - Project1
Forms
Form1 (Form1)
Designers
ShapesDsgnCtl1 (ShapesDsgnCtl1)
Properties - Variable1
Variable1 Variable
Alphabetic
Categorized
(About)
(Custom)
(Name) Variable1
CancelBlock False
ControlIn True
Index
InitialValue
Left 20000
NewValue
Tag
Top 20000
Value
418
(Name)
Returns the name used in code to identify an object.
1402
1414
1404
Cmd
Form1.CommandButton1
A
Form1.Label1
1412
A
Form1.Label2
1420
1408
FOR
Form1.ForLoop1
X+Y
Form1.CBAdd1
1424
X>Y
Form1.CBGreaterThan1
1428
1432
VAR
Form1.Variable1
abl
Form1.TextBox1
1436
Form1.Break1
Start
Project1 - Microsoft Visual ...
Microsoft Word - Document2
Variable Control Properties
9:40 PM

FIG. 14D

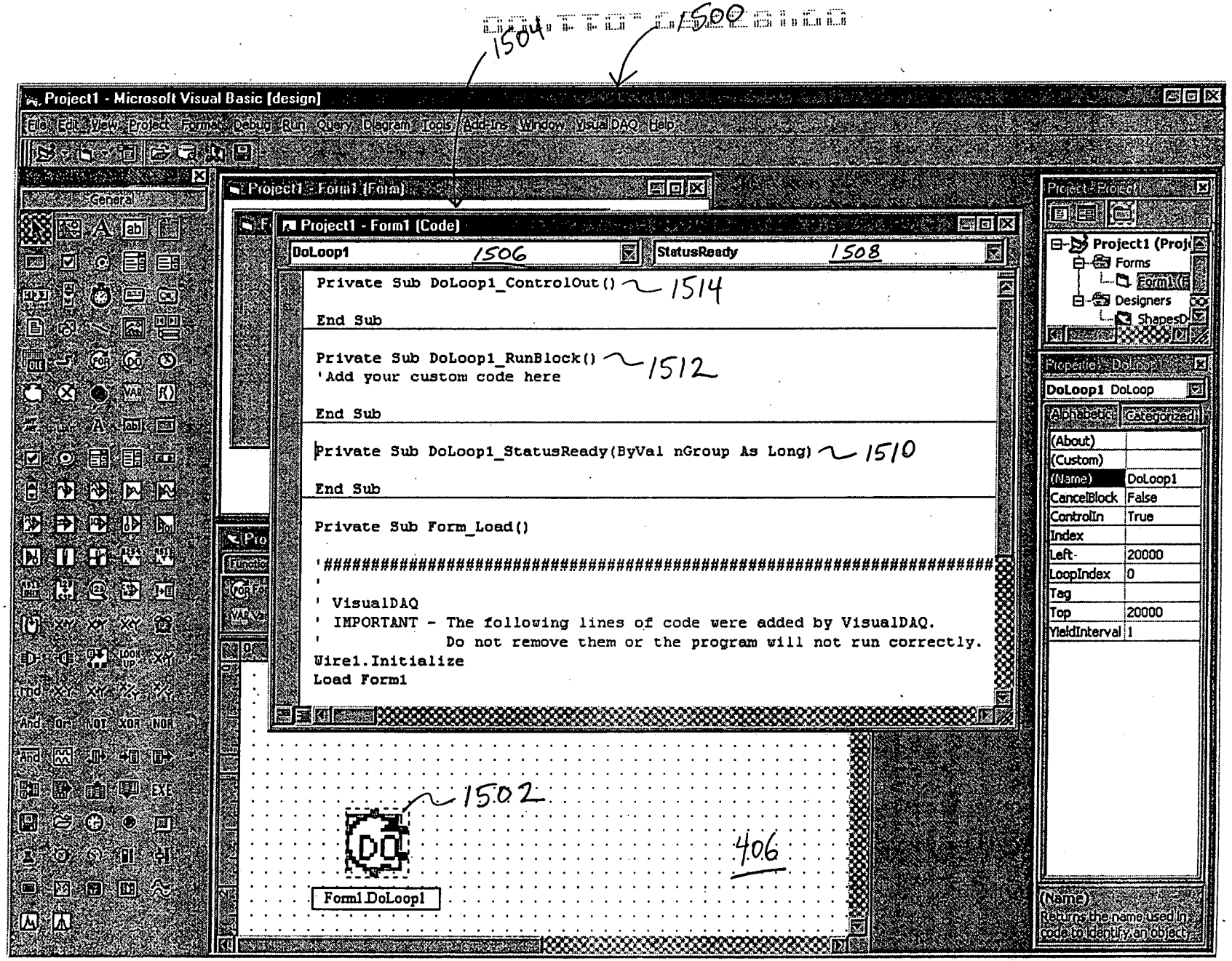
1500
1504
Project1 - Microsoft Visual Basic [design]
File Edit View Project Format Debug Run Query Diagram Tools Add-Ins Window Visual DAQ Help
Project1 - Form1 (Form)
Project1 - Form1 (Code)
DoLoop1
1506
StatusReady
1508
Private Sub DoLoop1_ControlOut()
1514
End Sub
Private Sub DoLoop1_RunBlock()
'Add your custom code here
1512
End Sub
Private Sub DoLoop1_StatusReady(ByVal nGroup As Long)
1510
End Sub
Private Sub Form_Load()
'##########################################################################
'
' VisualDAQ
' IMPORTANT - The following lines of code were added by VisualDAQ.
' Do not remove them or the program will not run correctly.
Wire1.Initialize
Load Form1
1502
406
Form1.DoLoop1
Project - Project1
Project1 (Proj
Forms
Form1 (F
Designers
ShapesD
Properties - DoLoop1
DoLoop1 DoLoop
Alphabetic
Categorized
(About)
(Custom)
(Name) DoLoop1
CancelBlock False
ControlIn True
Index
Left 20000
LoopIndex 0
Tag
Top 20000
YieldInterval 1
(Name)
Returns the name used in code to identify an object.

FIG. 15

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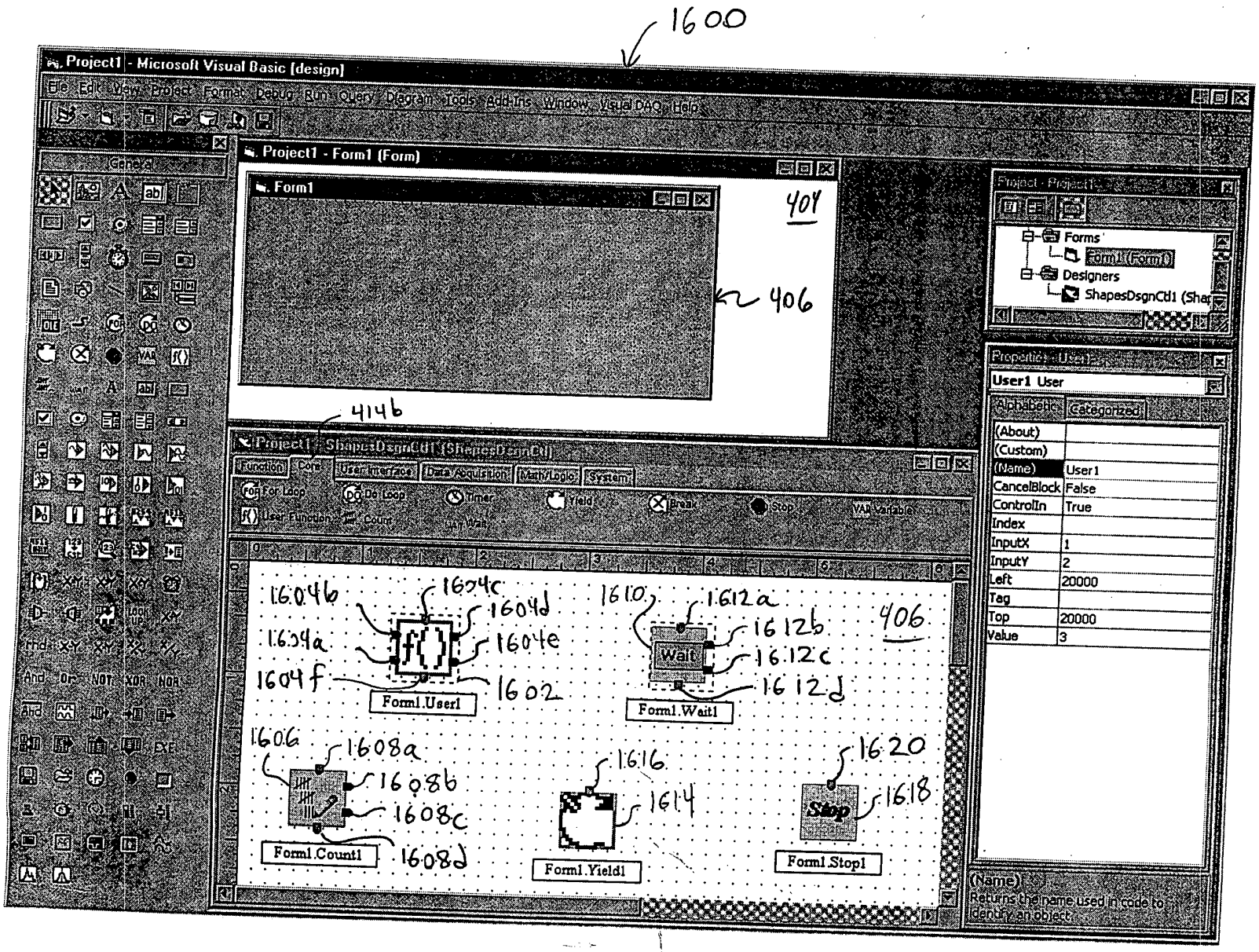


FIG. 16